Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 26 July, 1933 Number 1

MEMBER AUDIT BUREAU OF CIRCULATIONS

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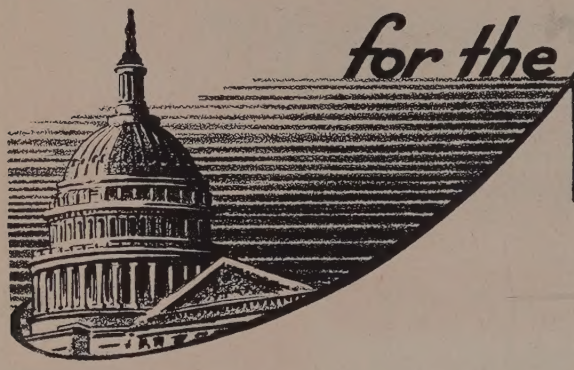
Is Your Plant Ready for the New Deal?



THE Government public works bill is signed, sealed and already under way. This vast program means millions in new business for the rock products industry in the next few months.

Are you prepared to handle your share on the most profitable basis? To meet competition in the production of lime, cement and similar materials, you need the extra large economies that Raymond equipment can give you.

Raymond Mills show savings of a third to a half in the cost of grinding coal, or in the pulverizing and drying of limestone. Raymond Separators, operating in closed circuit with grinding units, insure greater tonnage at lower cost in classifying raw mix, cement clinker and hydrated lime.

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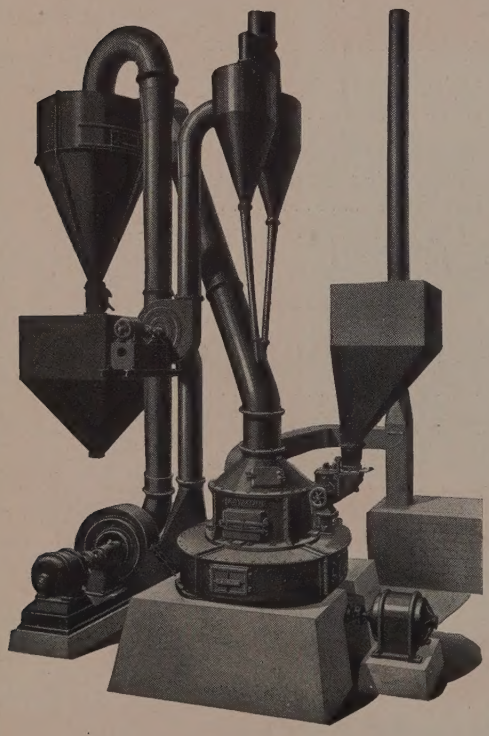
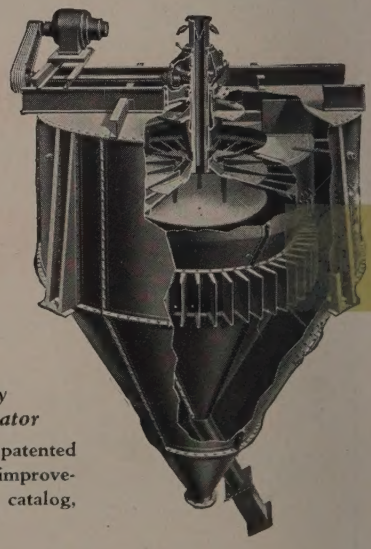


New Raymond Roller Mill

Proven the cheapest method known for grinding coal, wet or dry, for direct firing or storage systems. Many other applications described in the "Roller Mill Catalog."

Are you planning to attend A CENTURY OF PROGRESS in Chicago this summer? Then we invite you to visit the Raymond Kiln Mill Exhibit in the MUSEUM OF SCIENCE AND INDUSTRY.



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VOLUME 26 NUMBER 1

Pit and Quarry
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CEMENT-MILL & QUARRY
CHICAGO, JULY, 1933

Production of Cement Shows Rapid Increase

ANTICIPATE BETTER BUSINESS

Cement production in the United States is rapidly being increased as a result of the improved business and price conditions and in anticipation of the immense quantities of cement which will be required by the public works program. Many cement plants were reopened during the past month, some of them after having been shut down for 4 or 5 months, and many others are reported to be ready to operate on short notice. Those already opened include the following: Alpha Portland Cement Co., Jamesville and Cementon, N. Y.; Ash Grove Lime & Portland Cement Co., Chanute, Kan.; Glens Falls Portland Cement Co., Glens Falls, N. Y.; North American Cement Co., Alsen, N. Y.; Medusa Portland Cement Co., Dixon, Ill., and West York, Pa.; Northwestern States Portland Cement Co., Mason City, Ia.; Marquette Cement Mfg. Co., Oglesby, Ill., and Cape Girardeau, Mo.; Lehigh Portland Cement Co., Oglesby, Ill., and Mason City, Ia.; Southwestern Portland Cement Co., Osborn, O.; Olympic Portland Cement Co., Bellingham, Wash.; and the Portland Cement Co. of Utah, Salt Lake City, Utah. The Canada Cement Co., also recently opened its plant at Hull, Quebec.

Japanese Cement Plant Buys Grate-Type Kiln

★ The Mikawa Cement K. K., Tawara-Machi, Atsumi Gun, Japan, has purchased a 900-bbl. capacity Lepol kiln from G. Polysius, A. G., Dessau, Germany.

Let 400,000-Bbl. Contract for Boulder Dam Cement

Contracts for 400,000 bbl. of cement for Boulder Dam were recently awarded to four Southern California cement plants on a joint bid at $1.40 per bbl. This quantity, which will be used up by Nov. 1, makes a total of 1,250,000 bbl. already purchased for the dam and it is estimated that 3,500,000 bbl. more will be required in the next two years.

The Riverside Cement Co., the California Portland Cement Co., the Southwestern Portland Cement Co., and the Monolith Portland Cement Co. made the joint bid in competition with cement companies in Utah and northern California. The cement is a special low-heat product designed especially for Boulder Dam by the cement companies in conjunction with the building materials laboratory of the University of California.

Texas Cement Plant Installs New Coolers

★ The San Antonio Portland Cement Co., San Antonio, Tex., has purchased two Lee Process clinker coolers, one for each of its 200-ft. kilns. The coolers are expected to be in operation in August.

★ J. C. Showalter, Blue Ball, Lancaster County, Pa., recently put into operation a small new crushed stone plant using Niagara vibrating screens.

What is the National Industrial Recovery Act? See pages 16 to 20 of the June issue for the full text and comments.

What can trade associations do to help industry? See Mr. Figsby's article on page 49 of this issue.

What does the public-works program mean for aggregates producers? See the table on page 21 of the last issue.

What rules govern the expenditure of the $400,000,000 highway appropriation? See the article on page 45 of this issue.

How much money will each state receive for roads? See the table on page 15 of this issue.

What are the aggregates industries doing to comply with the law? See the article on page 20 of this issue.

What code did the lime industry approve? See the lime convention report on page 33 of this issue.

Nat. Sand & Gravel Assn. Gets 81 New Members

CONFORM INDUSTRY TO N. I. R. A.

Since the National Sand & Gravel Assn. commenced its program of bringing the sand-and-gravel industry within the requirements of the National Industrial Recovery Act, 81 new companies, representing every part of the United States, have been added to its membership list. It is a representative assembly of established producers.

Ohio Company Builds Mineral Wool Plant

★ An experimental plant for the production of mineral wool was recently established at Tiffin, O., by the Seneca Rock Wool Co., with offices at 471 E. Market St. Backers of the project are: Clark V. Gallagher, Karl J. Heilmann and I. B. Engle. The waste materials from various local quarries will be used in this plant which has a capacity of 20 tons daily.

Marquette Gets 2,000,000 Bbl. Illinois Contract

Governor Henry Horner of Illinois on June 23 ended a three months' price war with cement producers of that state when a contract for 2,000,000 bbl. of cement was awarded to the Marquette Cement Mfg. Co., Chicago. This cement, according to Governor Horner, was purchased under the Sinnett law which was recently rushed through the state legislature and which permits the state to buy its supplies on the open market at not more than 90 per cent. of the lowest bid rejected. The purchase price amounted to $1.44 per bbl. and a saving of $360,000, compared with the bids rejected, is claimed. Over 30,000 men went back to work for 54 major paving outfits with the signing of the contract.

★ The Ohio Gravel Co., Cleves, O., recently purchased a 470-ft., 36-in. wide, 8-ply Cincinnati Rubber Mfg. Co. conveyor belt.

National Industrial Recovery

Procedure of Forming Trade Code Explained

AGGREGATE MEN IN HARMONY

Industries are now rushing to organize, and manufacturers who have not been members of the associations formed for the purpose of promoting the interests of their respective industries, are not only willing but anxious to join. The reason is the National Industrial Recovery Act. While mechanics of the formation of codes of practice, which will be the rules that will guide industry during the next two years or more, are not as well defined as they should be, the major industries in the nonmetallic-minerals field are working along the following general lines. First, the man representing the President and appointed by the President is Gen. Hugh S. Johnson. The President has the last word in the acceptance or rejection of the proposed code of any industry. Codes will be submitted to Gen. Johnson by a committee of not more than three men from an industry. This contact committee of three will in most cases be chosen from a national committee of men appointed to represent the various territorial groups of producers. The number of men from each territorial group on the national committee may not be the same for each industry but it is not likely that these group committees will number more than three. The groups will consist of one representative of each firm in the district or territory in the industry. These districts or territories will be established from a production standpoint rather than a marketing standpoint.

The formation of a code and its administration after acceptance will therefore follow this general organization; the federal administrator, the contact committee, the national committee formed of the group committees, and the groups.

The purpose of the recovery act is to put more men to work, to set the minimum wage which an industry may pay, to fix the maximum hours which any employee shall work, and establish such practices as will aid in national recovery. To obtain these objectives codes of fair competition will be drawn up for each industry, either by the industry itself or, if it refuses or neglects to submit a code, by the government. Should any member of an industry fail to agree to a code, the president can compel the licensing of the members of an industry and can refuse a license to, and close down the plant of, the member who refuses to agree to or act under the code.

In general codes are being formed in this manner. The district groups are obtaining data on wages, hours of labor, and a schedule of unfair trade practices. Agreement is reached on the minimum wages and hours of labor and on the schedule of unfair trade practices. The committees from each group then meet as the national committee and this committee writes the code which is presented to the federal administrator by the contact committee.

The administrator calls for a public hearing at which minorities, representatives of labor and of the buying public may be heard and propose changes. When Gen. Johnson has approved the code, it will be passed on to the President. When it is published by him, it will have the force of law.

It will be seen that there will be differences of opinion between groups of producers and that these will probably be harmonized by the group committees. Differences of opinion are also to be expected from competing industries. In order to forestall this to some extent the National Sand & Gravel Assn., the National Crushed Stone Assn., and the National Slag Assn., are uniting their forces in the formation of a single code for the three industries as explained on pages 20 to 25.

Nat'l Slate Assn. Draws Up New Code of Ethics

A meeting of the National Slate Ass'n. was held recently in connection with the National Industrial Recovery Act. Slate producers of New York, Vermont and Pennsylvania were present and were in complete accord on a code of ethics to be presented to the Government. All were convinced that this latest move to revive business will restore prosperity to the slate industry. The structural slate industry of New York-Vermont will be represented at Washington by Arthur Carpenter of Fair Haven, Vt., and the roofing slate industry by Arthur H. Morrow of West Pawlet, Vt.

Universal Atlas Plans Employee Representation

In compliance with the wishes of the President as indicated in the National Industrial Recovery Act the Universal Atlas Cement Co. recently announced a plan of employee representation which has already been put into effect in all of its plants. Briefly, the object of this plan is to give the employees a voice in regard to the conditions under which they labor and to provide more effective communication and means of contact between the management and the employees on matters pertaining to industrial relations.

Indiana Stone Operators Formulate Code of Ethics

The leading operators of the Indiana limestone district have formulated a new code of ethics signifying their willingness to cooperate with the National Industrial Recovery Act and have forwarded it to Washington. The code pledges the operators to abide by wage and hour schedules set up by the government and to accept no contract below production cost. About 30 companies, including all but 3 independent operators, have signed.

Nat'l Fertilizer Assn. Prepares Industrial Code

The National Fertilizer Ass'n. has appointed a committee of 10 to draw up a code for the industry to provide for operation under the N. I. R. A.

Lime Industry Considers Code of Fair Competition

The lime industry met in Atlantic City, N. J., June 27 to 30, inclusive, to consider a code of fair competition for presentation to the President for approval. The results of the conference are reported on pages 32 to 36 of this issue and in the story of the National Lime Assn. 15th annual convention.

Competition Requires Uniform Trade Code

On account of the competition between industries and the fact that various companies produce goods which are marketed as products of more than one industry it seems altogether likely that the various codes, as they relate to wages for the various classifications of labor and to hours of employment for the same section of the country, will have to be about the same. For example, cement competes with brick, lime with gypsum, and sand and gravel with crushed stone and slag. Lime plants produce not only lime, but in some cases crushed stone or ready-mixed brick mortar.

The term "unfair trade practices" may cover a multitude of sins. A few which are being considered are: selling below cost of production, lumpsum bidding, cutting the price on one item in order to sell another, allowing special discounts, rebating, and special concessions in terms of payment.

In order to have the same basis for arriving at the cost of production some industries are adopting a uniform accounting system, or are securing data to be used in establishing a uniform system.

Distribute $400,000,000 for Road Construction

FUNDS AVAILABLE ON JULY 1

On June 23 acting Secretary of Agriculture R. G. Tugwell apportioned, with the approval of the Special Board for Public Works (Secretary of the Interior Harold L. Ickes, chairman) the $400,000,000 appropriated by the National Industrial Recovery Act for expenditure on highway construction.

The money was available for expenditure July 1 for the construction of roads in the Federal-aid highway system and extensions thereof into and through municipalities, and for the survey, planning, improvement and construction of secondary or feeder roads to be agreed upon by the state highway departments and the Secretary of Agriculture.

Allocation of the money has been made in accordance with the requirements of the act, which provide that seven-eighths of the total sum apportioned to the states shall be divided in accordance with the three-way plan established by the Federal highway act which gives equal weight to population, area, and rural post-road mileage, and one-eighth in proportion to population. Sharing in the apportionment are the 48 states, Hawaii, and the District of Columbia. In apportioning the seven-eighths part the states of Delaware, New Hampshire, Rhode Island and Vermont, and Hawaii and the District of Columbia receive a minimum share of one-half of one per cent. The amounts allocated are shown in the table.

Texas gets $24,244,024, New York $22,330,101, Pennsylvania $18,891,004, Illinois $17,570,770, and California $15,607,354. Seven other states receive more than $10,000,000 each. The allotments need not be matched dollar-for-dollar by the states as in regular Federal-aid appropriations.

Rules and regulations for carrying out the work provided for by the funds apportioned were also promulgated by the Acting Secretary with the approval of Mr. Ickes as chairman of the Public Works Board. These rules and regulations define secondary or feeder roads as roads not now included in the Federal-aid-highway system, but which are either part of the state highway system, or important local highways leading to shipping points, or which will allow coördination or extension of existing transportation facilities, including highway, railway, airway, and waterway.

Not more than 50 per cent. of the funds apportioned will be applied to projects on the Federal-aid system outside corporate limits. Not less than 25 per cent. will be applied to extensions of the Federal-aid system into and through municipalities; and not more than 25 per cent. will be available for secondary or feeder roads until provision has been made for the satisfactory completion of at least 90 per cent. of the initial limiting mileage of the Federal-aid system, which is 7 per cent. of the state's certified rural-road mileage.

The rules are reprinted in full on pages of this issue.

FEDERAL FUNDS ALLOTTED TO STATES FOR ROAD-BUILDING UNDER THE NATIONAL INDUSTRIAL RECOVERY ACT

State	Total Apportionment	State	Total Apportionment
Alabama	$ 8,370,133	Nevada	4,545,917
Arizona	5,211,960	New Hampshire	1,909,839
Arkansas	6,748,335	New Jersey	6,346,039
California	15,607,354	New Mexico	5,792,935
Colorado	6,874,530	New York	22,330,101
Connecticut	2,865,740	North Carolina	9,522,293
Delaware	1,819,088	North Dakota	5,804,448
Florida	5,231,834	Ohio	15,484,592
Georgia	10,091,185	Oklahoma	9,216,798
Idaho	4,486,249	Oregon	6,106,896
Illinois	17,570,770	Pennsylvania	18,891,004
Indiana	10,037,843	Rhode Island	1,998,708
Iowa	10,055,660	South Carolina	5,459,165
Kansas	10,089,604	South Dakota	6,011,479
Kentucky	7,517,359	Tennessee	8,492,619
Louisiana	5,828,591	Texas	24,244,024
Maine	3,369,917	Utah	4,194,708
Maryland	3,564,527	Vermont	1,867,573
Massachusetts	6,597,100	Virginia	7,416,757
Michigan	12,736,227	Washington	6,115,867
Minnesota	10,656,569	West Virginia	4,474,234
Mississippi	6,978,675	Wisconsin	9,724,881
Missouri	12,180,306	Wyoming	4,501,327
Montana	7,439,748	Dist. of Columbia	1,918,469
Nebraska	7,828,961	Hawaii	1,871,062

New Bituminous Mixing Plant in Pennsylvania

★ The York Valite Co. has established a new $75,000 bituminous mixing plant on the outskirts of York, Pa., to supply material for highway work in that vicinity. E. C. Valentine is president of the company and S. H. Katz sales manager.

You Must Coöperate!

You've got to "take it on the chin," if you expect to put it in your pocket. That's the new game, the "new deal." You must give something, if you want to get something. Give your time July 13 and 14 in Chicago. It's a small contribution.

General Improvement in Canadian Business

EVIDENT IN ALL SECTIONS

The improved business conditions in the United States during the past few months is being followed by a similar upward swing in Canada. This condition first became noticeable in the central districts but has now spread to all parts of the country. Improvement is evident in the steel, textile, and other industries. Car loadings and bank clearings are increasing sharply over preceding weeks and there is a growing demand for building products.

New Texas Gravel Plant To Cost About $250,000

H. T. Farrell of Plano, Tex., is developing a gravel deposit of 500 acres on the Trinity River, half way between Dallas and Fort Worth. The plant is expected to cost about $250,000 and will be connected with the C. R. I. & P. Ry. at Tarrant by a 3-mile branch line.

Gravel Producer Adds Clay-Washing Equipment

★ Aggregate plants in all parts of the country are in active production in anticipation of the increased construction activity whose results are already being felt. Stockpiles are being built up to insure an adequate supply of material and many plants which have been shut down for a year or more are now in full operation. An example is the plant of the Springfield-Pekin Sand & Gravel Co., at Pekin, Ill. This plant went into operation for the season on June 1 and at this time all of the many thousands of tons of gravel and sand in its stockpiles is sold and the entire capacity of the plant for practically the balance of the operating season is contracted for.

Prior to opening up the plant for the season a number of additions were made to the plant equipment to remove clay in the deposit. The new equipment consists of two Simplicity vibrating screens, one 4 ft. by 8 ft. and the other 2 ft. by 3 ft., a McLanahan 22-in. single-roll crusher and a 25-ft. double log washer of the same make.

★ The Romesburg Stone Co., Garrett, Pa., recently installed a new McLanahan & Stone crusher for secondary reduction of limestone.

★ S. A. Wassum, Tekamah, Neb., has purchased a half interest in the business of the Burt County Gravel Co. of that city from D. S. Tomlinson, formerly sole owner. The company is now known as the Tomlinson-Wassum Gravel Co. A fleet of new trucks was recently purchased.

Incorporate New Ohio Finishing Lime Corp.

PLAN TO CONSOLIDATE PLANTS

A new corporation, known as the Sandusky Lime Products Co., with offices in Toledo has been chartered by the state of Ohio to buy lime plants and to conduct a general lime business. This company, authorized to issue 5,000 shares of no-par-value common stock, has been incorporated by L. E. Johnson, secretary of the Ohio Finishing Lime Assn., and two attorneys, C. V. Wolfe and R. H. Rodgers. The company has purchased the plant of the France Lime Products Co., at Gibsonburg, O., and it is reported that the unfilled orders of that company are being filled by the Kelly Island Lime & Transport Co., which has a plant at Gibsonburg. It is understood that negotiations are under way for the purchase of the plants of the Bruns Lime Co., of Woodville, O., and the Gibsonburg Lime Products Co., of Gibsonburg, O., the two latter plants having been out of production for some time. This leaves still active in the manufacture of finishing lime in northwestern Ohio the Kelly Island Lime & Transport Co., the United States Gypsum Co., the National Gypsum Co., the Woodville Lime Products Co., the National Mortar & Supply Co., the Ohio Hydrate & Supply Co., and the National Lime & Stone Co.

Wisconsin Lime Plant Installs New Equipment

★ Fowler & Pay, Mankato, Minn., have installed a complete hydrating plant at LeRoy, Minn., and are hydrating chemical lime. The equipment includes a Clyde hydrator, Raymond separator and crushers and pulverizers.

Cement-Wrapped Pipe Co. To Build Third Plant

The Cement-Wrapped Pipe Co., which has plants at San Francisco and Los Angeles, Cal., is preparing plans for the construction of a new $40,000 permanent plant at Seattle, Wash., according to W. A. Kraner, vice president of the company. This announcement was made immediately after the Seattle Board of Public Works awarded a $373,323 contract for water supply lines specifying the use of cement-covered steel piping. The company also coats wood piling.

New Pennsylvania Plant Uses Vibrating Screens

The Kelly Run Stone So., Wilkes-Barre, Pa., recently erected a new crushed stone plant using a Niagara single-deck scalping screen and a triple-deck sizing screen of the same make.

Tennessee Gravel Plant Enjoying Good Business

The Estill Springs Sand & Gravel Co., Estill Springs, Tenn., has been running its plant continuously for the past two years without a shutdown. According to Supt. L. G. Banner business has improved noticeably in the last two months and the plant is now running 24 hours a day.

New Gypsum Wallboard Plant Nears Completion

★ Operations are expected to begin about July 15 at the new wallboard plant of the U. S. Gypsum Co., Midland, Cal. The buildings have been completed and installation of machinery is progressing rapidly.

Pennsylvania Limestone Mine Damaged by Blast

Considerable damage was done recently in the mine of the Pittsburgh Limestone Co. at Brady's Bend, Pa., by a dynamite explosion. John Jarnevich, an unemployed limestone workman who was believed to have a grudge against the company, touched off several boxes of dynamite in the mine about 1,000 ft. from the entrance wrecking the sub-station and motor-generator set located there and badly damaging the electric shovel. Jarnevich died shortly afterward from self-inflicted wounds when he touched off a stick of dynamite concealed in his shirt. Repair work was immediately begun and the plant and mine are now in full operation.

★ The Romesberg stone quarry, located 4 miles west of Garrett, Pa., recently went into operation after having been shut down for the winter. Some new machinery was installed in the plant and a new truck was purchased to haul the stone from the quarry to the plant.

★ The Barrett Co., New York City, recently installed a Jigger vibrating screen, made by the Productive Equipment Corp., Chicago, in one of its plants.

Keep July 13-14 Open!

If you produce aggregates of any kind and expect to continue to produce them at a profit, be in Chicago on these days for consideration of the Code of Fair Competition. The code adopted will be the law of your industry. Be at the Palmer House, Chicago, July 13 and 14, if you have a business worth saving!

Government Upholds Higher Cement Prices

MISSISSIPPI PLACES ORDERS

The Mississippi State Highway Department recently received word from the Bureau of Public Roads at Washington that it had rejected bids on a million barrels of cement and that the bids were not too high but too low. Purchasing large quantities of cement against future advances of the market is contradictory to the public policy in the industrial recovery act and Washington believes that cement prices will rise and the quoted bids would soon be below the cost of production.

Ten cement plants were awarded the contract for supplying the cement which is to be used as a part of a $10,000,000 construction program in Mississippi. Prices range from $2.36 to 2.71 f.o.b. to 252 points in the state. The list of companies and the amount ordered from them follows: Alpha Portland Cement Co., 225,000 barrels; Hermitage Portland Cement Co., 175,000; Marquette Cement Mfg. Co., 75,000; Arkansas Portland Cement Co., 50,000; National Cement Co., 75,000; Pennsylvania-Dixie Cement Co., 225,000; Universal Atlas Cement Co., 25,000; Signal Mountain Portland Cement Co., 25,000. Three Birmingham plants, those of the Alpha, National and Universal Atlas companies received approximately 275,000 bbl.

Eastern Stone Producer Builds Washing Plant

★ The Worlock Stone Co., Canastota, N. Y., recently put into operation a new $15,000 washing plant alongside its crushing and screening plant. A scrubber and screens comprise most of the equipment of this new unit which has a capacity of 100 tons per hour.

Pennsylvania Plant Is Operated Under Lease

The New Castle Lime & Stone Co., New Castle, Pa., has taken a lease for several years on the limestone holdings and plant of the Kittanning Limestone Co. a short distance above Lock 7 on the west bank of the Allegheny River near Kittanning. The lease took effect on June 1 and the same crews have been retained as under the former management. The stone produced is being used almost exclusively for highway purposes. Additional screening equipment is being installed.

★ The Whitehall Cement Mfg. Co., Cementon, Pa., recently installed a Blaw-Knox deduster.

P.C.A. Building Test Cement-Bound Road

STONE, GRAVEL AND SLAG USED

The Portland Cement Ass'n. is at present engaged in the building of an experimental cement-bound macadam road near Elmhurst, Ill., just west of Chicago. Sixty test sections are being built in a road 1200 ft. long. The principal objective of this test is to develop and demonstrate design and construction practices that will permit cement-bound macadam to be used efficiently under practically all conditions.

Crushed stone, slag, and gravel will be used in the various sections, with grout of varying consistencies. Field and laboratory tests will be made. Construction was started during the week of June 12 and will be completed about July 20.

Ohio Gravel Producer Installs Roll Crusher

★ The Oak Hill Gravel Co., Springfield, O., recently installed a 16-in. by 24-in. F. M. Welch double-roll crusher equipped with a geared driving link. This installation was made for the purpose of reducing various sizes of gravel to crushed gravel.

Mississippi Producer Erects Gravel Plant

The Mississippi River Gravel Co., Rosedale, Miss., was recently incorporated with a capital of $10,000. According to A. M. Howard, manager, the river equipment of the Tenn.-Ark. Gravel Co. was moved from Arkansas City and a new plant was erected at Rosedale.

Pittsburgh Producer Builds Concrete Plant

The firm of J. K. Davison & Bros., Pittsburgh, Pa., recently put into operation a new ready-mixed-concrete plant in that city. Blaw-Knox equipment is used in the plant and delivery is made in Blaw-Knox mixer bodies mounted on International trucks. J. E. Burke, formerly general manager of the Ready Mixed Concrete Co., Pittsburgh, is general manager of the new Davison ready-mixed-concrete division.

The Duluth Crushed Stone Co. has moved its offices from 1505-6 Alworth Bldg. to 1013-14 Fidelity Bldg., Duluth, Minn.

★ The Whittemore Sand & Gravel Co., Cambridge, Mass., recently added to its operations in that city a batching plant for measuring materials to concrete mixer trucks.

New Mexico Sulphur Plant in Operation

The New Mexico Acid Co., Jemez Springs, New Mexico, has leased a 1,000-acre property from the state and construction of a 150-ton capacity refinery for the production of sulphur is to begin immediately. Mining will be done with steam shovels from the deposits which have already been surveyed, core drilled and mapped out. Officers of the company are: Harry A. Zeck, president; F. B. Porter, vice president; F. J. Bunker, secretary and treasurer.

Pacific Coast Gravel Producer Moves Office

The Pioneer Sand & Gravel Co., Seattle, Wash., has moved its general offices to its warehouse on the shore of Lake Union, at 901 Fairview Ave.

Small New Stone Plant Operating Double Shifts

The Baker-Wilson Stone Co., DeWitt, Mo., recently installed a crusher and other equipment at a limestone deposit near that city which it has leased for a period of three years. The plant is operating two shifts a day to supply the demand for aggregates.

Diamond Alkali Buys New Vibrating Screens

★ The Diamond Alkali Co., Pittsburgh, Pa., recently purchased three additional 3-ft. by 8-ft. single and double-deck vibrating screens from the Productive Equipment Corp., Chicago.

New Mexico Potash Plant Installing Gas Pipeline

The United States Potash Co. has contracted with the Phillips Petroleum Co. to supply gas to its plant east of Carlsbad, N. M., for a period of 10 years. Work on the pipe line is to begin immediately. A large warehouse for storing potash was recently completed by the company which is now mining 450 tons of potash daily.

★ The Concrete Materials Corp., Humboldt, Ia., recently purchased a 455-ft., 24-in. wide, 6-ply Cincinnati Rubber Mfg. Co. conveyor belt.

The Government Means Business!

Don't scoff at the National Industrial Recovery Act because you think it savors of socialism, collectivism, or "professorialism." It has sharp teeth, its jaw is set, and it has a powerful bite. If you don't believe it, don't come to Chicago, July 13 and 14, because there you may hear some shocking news.

Michigan Firm Wins Suit Against Railroad

AWARDED $60,000 DAMAGES

After more than five years of litigation the Federal Gravel Co., now the Michigan Gravel Co., of Saginaw, Mich., was awarded damages of $60,000 from the Detroit & Mackinac Ry. Co., and the Alpena Gravel Co. The Federal Gravel Co., with pits at Greenbush and Emerson, Mich., claimed that it was forced out of business by unfair competition from the railroad-owned pit of the Alpena company. It was contended that the latter sold gravel at less than the cost of production and made its profit on freight charges. Two years ago the Bay County circuit court awarded the plaintiff a judgment of $155,000 but both parties carried the case to the Supreme Court with the above results.

New York Cement Plant Making New Admixture

The Century Masonry Cement Co., Rosendale, N. Y., has resumed operations after a shutdown of four months. The company is now making a new "Rocktite" admixture for the improving and waterproofing of Portland cement concrete in addition to its dark and light-colored masonry cements.

Burned South Carolina Plant Being Rebuilt

The Sand Drying Co. is preparing to rebuild its plant at Ten Mile, S. C., which was recently destroyed by fire. F. A. Hoever is vice president of the company which has its headquarters at Charleston, S. C.

Michigan Firm to Sell Ready-Mixed Concrete

★ The Concrete Service, Traverse City, Mich., has erected buildings in that city for the storage and handling of washed sand and gravel and the batching of aggregates for ready-mixed concrete. Transit-mixing trucks will be used for mixing the concrete.

Legalization of Beer Helps Silica Producers

Silica sand plants in all parts of the country are prospering as a result of the legalization of beer. Glass manufacturers are working at capacity and their demand alone has caused plants to add to their forces, lengthen their hours and in some cases even to work day and night.

A new company known as the City Sand & Gravel Co., has engaged in business in Medford, Ore., under the management of Roy Moore.

Editorials

Cement in Illinois

THE cement situation in Illinois presents a rather discouraging outlook. Some months ago, when several competing cement manufacturers tendered identical bids for furnishing the Illinois state highway department with 3,000,000 barrels of cement, Governor Horner and his political cohorts raised a deafening clamor about the "cement trust" which, in defiance of the country's anti-trust laws, had had the effrontery to act in concert and so defeat the purposes of competitive bidding. The governor issued threats of condemnation and, in fact, finally authorized the state's attorney general to proceed with condemnation action, not only against the Illinois cement-making plants but also against Illinois dealers who might be found with stocks of cement on hand. No effort was to be spared in making these incorrigible manufacturers conscious of the power of state government.

Of course, this gesture had all the appearances of being motivated by a fine regard for the public interest. The governor let it be known that he was determined to prevent a concerted raiding of the public treasury and that he was equally determined that the hungry unemployed cement-mill workers should not be denied their inborn rights as American citizens to gainful employment. High-sounding language this—words which were calculated to, and did indeed, produce a feeling of animosity toward the cement industry on the part of citizens in all walks of life. In spite of many years' experience with similarly insincere utterances by public officials and the disillusionment that always followed in their wake, the working classes, the middle classes, and even the supposedly more astute upper classes took up the cry and applauded the governor for his "fearless stand" against the powers of big business. There was a wavering between doubt and belief on the part of some cement makers themselves, until finally the pressure of selfish interest persuaded one of these to desert his fellows and to accept two-thirds of all the proffered business at a price 18 cents below the identical bids of $1.62 a barrel. This had the effect not only of placing the Horner administration and the "successful" bidder in the light of public servants actuated by the highest devotion to the general good and capable of any amount of self-sacrifice, but it strengthened the gullible public's impression (already too strong) that the other cement manufacturers were guilty of all the crimes charged against them and that they were, in the truest sense of the word, enemies of the public interest.

We are not discouraged by the fact that the average newspaper reader allowed himself to be deceived into making an incorrect appraisal of the motives of the state government, for we long ago abandoned all hope of ever seeing a populace capable of placing a correct value on its politicians. Nor are we discouraged by the fact that self-interest still shows its ugly head among us, for we are still far from being a civilized race fit for the responsibilities of a highly-socialized existence. But we are disappointed at the seeming willingness of one cement maker to leave his fellow industrialists waiting for the state to take final action on bids that were the result of a general recognition of the need for sustaining prices on a profit-making basis while he decided that it was expedient to become the successful bidder by a resort to the very price-cutting that cement manufacturers have so often condemned. We are inclined to feel discouraged at this evidence of an unwillingness to coöperate when coöperation is vital to the life of the cement industry, of an unwillingness to place industrial solidarity above immediate self-interest, of an unwillingness to be satisfied with a *pro rata* division of the state's business among all who participated in the bidding.

At a time when the federal government, keenly aware of the necessity of placing public good above private advantage, has given trade associations the power to regulate the competitive methods of their members so far as the hours and wages of labor are concerned and will conceivably also empower them to allocate or prorate production with the object of stabilizing industry and outlawing unfair competitive practices, this example of reliance upon selfish interest rather than industrial harmony is a discordant note. When the government has made it clear that the anti-trust laws are to be held in abeyance in order to give industry every opportunity to restore is equilibrium, and when that government is directed by politicians of the same color as those who, in their local field, make the spirit of federal policy impossible of operation, one wonders what to expect even in the face of national emergency.

It is noteworthy that this defection in the ranks of the cement makers occurred before their trade association had had an opportunity to prepare and receive government approval of a code of fair competition which would have made such action subject to a penalty much severer than the moral disapprobation which it has already earned.

Use the Bureau of Mines

IT is natural that the industrial-control and public-works appropriation sections of the National Industrial Recovery Act should in their principal features monopolize attention and comment. Their main provisions have been so shocking in their general novelty that little notice has been taken of some of the details of the administrative system set up by it.

Section 2 (b) of the act provides that "the President . . . may establish an industrial planning and research agency to aid in carrying out his functions under this title" —that is, the "industrial recovery" portion of the law—and in subdivision (a) of the same section it is said that "to effectuate the policy of this title, the President is hereby authorized . . . to utilize such federal officers and employees . . . as he may find necessary . . ." That is to say, he is empowered to appoint new agencies or to use existing agencies in order to carry out the intent of the law with respect to the control of industry.

In view of the President's pleas for economy and the pledges of his party, it seems reasonable to suppose that he will, wherever possible, make use of government bureaus that already exist and that have demonstrated their fitness to serve not only in their original capacities but also in the newer duties that are created by the act. Conspicuous among such existing agencies is the Bureau of Mines, which, through a long period of effective service to the mining industries of America, has shown an ability and an understanding of the needs of those industries far in excess of the qualities usually credited to government bureaus.

The Bureau of Mines has worked continuously and intelligently for the advancement of the mining industries and no class of producers should be more aware of this fact than the producers of nonmetallic minerals. This group is, according to universal admission, deeply indebted to the bureau for its untiring and well-directed work toward improving mining practices. Its studies of mining methods, its educational work in the interest of greater safety, its services as a clearing house for production statistics, and its invaluable coöperation with the mineral-aggregates trade associations in the formulation of uniform cost-accounting methods are widely known and deeply appreciated by the nonmetallic-mineral industries. The bureau has performed, and is ably fitted to continue to perform, the very type of "industrial planning and research" activities which the new law requires.

The knowledge, technical ability and experience of the Bureau of Mines have earned the respect and good-will of all classes of producers, to whom the members of the bureau's staff are personally known by their active, practical and helpful work at headquarters and in the field. The bureau's personnel has the power, through mere recommendation alone, to win for the government's program of industrial control the quick, whole-hearted and honest type of coöperation which is so essential to a rapid application of the law's provisions and to the fullest realization of the benefits it promises. In our opinion it would be a serious mistake to set up any new agency to perform duties within the scope and experience of the Bureau of Mines, when the government is already possessed of an agency so well schooled, so well organized, and in such high repute.

One of the most serious criticisms leveled at the new law is the fear that it will encourage the formation of needlessly-complicated administrative machinery and so increase, rather than decrease, the fixed charges which the government must defray. Retention of the Bureau of Mines is justified not alone on account of its demonstrated capacity for very useful and valuable work, but also because its utilization in these newer functions will avoid the duplication of organization and effort that seem to be the almost inevitable results of new legislation which, in broadening the powers of government, sets up new opportunities for political patronage.

Criticism of the "New Deal"

CRITICS of the National Industrial Recovery Act are already beginning to find what they consider inevitable evil consequences of its enactment. The recent hearings, during which the proposed code of fair competition presented by the cotton-textile industries was considered, have provided the first evidence. After the code was submitted, discussed and apparently approved, and after probable opponents had left the meeting in the belief that nothing further was to be said or done, the manufacturers' trade association is reported to have submitted further regulations governing the entrance of newcomers into the field, the enlargement of existing production facilities, and the like. These, it is said, were approved and accepted. Those who adversely criticize the act and who have consistently stood against it since before its enactment cite this as evidence of the law's power to prevent the development of new enterprises as well as the expansion of old and of its opposition to the established American traditions of free initiative and free competition.

The new law is not "death to individualism" as its self-seeking critics would have us believe, nor does it cripple initiative or stifle ambition. If it did any one of these things, it could not have won the support of so many men who are accustomed to weigh problems and remedies in the light of their effects on the general good. There will still be room for individualism, but it will be an individualism of the mind rather than of the tooth and claw. There is still room for initiative among men who are determined to make a good showing even under what may seem to be, and may indeed prove to be, great obstacles. There is still room for the kind of ambition that strives to serve better, to give more, to coöperate more whole-heartedly than its competitors.

Nearly everything will be regulated under the industrial-recovery program—everything but individual capacity to think, to study and to plan. That, being a matter of individual capacity, can not and, naturally, will not be regimented. The new competition, the "new deal" if you please, transfers rivalry from the field of catch-as-catch-can scrambling to that of intellectual contest. The rewards are the same, the tools are the same; only the rules have been changed. The man or corporation that can not meet this test will not make much of a showing in the fight for survival.

Mineral-Aggregates Industries Ready to Approve Competition Code

All Producers Invited to Attend Huge Open Meeting in Chicago, July 13-14

THE mineral-aggregate industries, through their national associations of crushed-stone, sand-and-gravel, and slag producers, have been moving forward steadily in their efforts to readjust themselves to the new order of things set up by the passage of the National Industrial Recovery Act. At a conference of representatives of the National Crushed Stone Assn. and the National Sand & Gravel Assn., held in Washington on May 23 when it seemed certain that the recovery bill would be enacted into law, it became apparent that the community of interest between the two associations' members would justify the development of a joint code of fair competition for the two industries. Negotiations were later carried on with the National Slag Assn. and as a result meetings of the executive committees of the three associations were held in Washington, independent meetings on June 1 and a joint meeting on June 2.

At the joint meeting on the second day it was unanimously decided: (1) that a single code of fair competition should be prepared for the mineral-aggregates industries (crushed stone, sand and gravel, and slag), and (2) that the secretaries of the three associations should harmonize the changes made at the separate meetings held on the first day, when the same proposed code was separately considered and modified by each association. The three forms of the code were harmonized on June 5 and the resulting draft was informally submitted to R. K. Strauss, who was acting as assistant to Gen. Hugh S. Johnson, the Administrator of the National Industrial Recovery Act. Subsequently the code was submitted to the three associations' presidents and later to their executive committees before the presentation to the three industries which will be made at the meetings to be held at the Palmer House, Chicago, July 13 and 14. All producers have been invited to attend regardless of whether they belong to any existing producers' associations.

On July 13 each industry will hold an independent meeting to consider the code, and on the following day all will meet jointly. The code will receive final and definite action at the joint meeting and will then be presented to Administrator Johnson. As soon as it receives his approval it will become the law of the mineral-aggregates industries and all members of those industries will be held legally accountable for its strict observance. The penalties for violations of the rules are severe and cumulative. [See Sec. 9a of the bill, reprinted in full in PIT AND QUARRY, June, 1933 (xxv, 10), p. 18.]

Some idea of the varieties of practices which come within the meaning of "fair competition" may be derived from the following list of titles of rules which were considered for incorporation in the code:

Division of country into mineral-aggregates producing districts.
Rights of labor.
Maximum hours of labor and minimum rates of wages.
Rates of wages by classifications of employment.
Monthly affidavits.
Statistics.
Administration and enforcement of code.
Limiting plant capacity and new production.
Fair selling price and competitive conditions.
Basis of selling rates.
Absorption of freight charges.
Secret rebates.
Interference in contracts.
Defamation of competitors.
Conformity with specification requirements.
Misbranding.
Uniform terms of sale and uniform credit practices.
Uniform cost-accounting.
Enforcing observance of code by retailers and distributors.
Official contacts with President of the United States.
Changes in code.
Selling below cost.
Payment of secret commissions.
Commercial bribery.
Lump-sum bidding and contingent selling.
Antidumping.
Enticement of employees.
Accident prevention.
Suspension of governmentally-operated aggregate plants.
Forbidding employment of convict labor.

It was the opinion of those present at the Washington meetings in June: (1) that the code should provide for price and production control, and (2) that a license to construct and operate a new plant in any area should be denied whenever present production facilities in that area are in excess of normal or potential demands. While such rules may be written into the code, it is incumbent upon these industries to show that such rules will result in the stabilization of those industries and will provide more jobs at higher wages—two of the objectives of the recovery act.

With the object of clarifying much of the confused thinking on the code problem, V. P. Ahearn, executive secretary of the National Sand & Gravel Assn., and J. R. Boyd, secretary of the National Crushed Stone Assn., prepared, with the aid of the producers present at the Washington meeting, a list of questions which were presented to men in official and semi-official positions in the government. The questions and digested replies follow:

1. *Are we correct in advising our industry that their business, although essentially intrastate in character, is necessarily subject to the provisions of the legislation under the clause, "in or affecting interstate commerce"?* The answer to this is uniformly "yes." All doubht on this score is definitely eliminated.

2. *Is it possible, under the bill, to provide a licensing system which will attack probably our main problem—the introduction of new plants in areas where overproduction is already suicidal?* The best answer to this is that the President will proceed slowly in this direction; but if it can be proved that it is absolutely necessary and that without it no stability will be afforded, then by all means fight to the limit to get it.

3. *If our industries decide that price and production control are necessary, in their opinion, for full stabilization and for providing the maximum amount of employment with the highest wages possible, would it not be desirable to incorporate these rules in our code even though they may be rejected by the President?* Again the answer is decidedly in the affirmative.

4. *Is it not the determination of the President to have one single code for each industry, and would not 48 codes for our industry manifestly demoralize effective administration?* The answer to this is emphatically that there will be *only one* code for each industry, and it will operate throughout the United States as the law of that industry. In the case of the mineral-aggregates group, of course, the code must be sufficiently flexible to permit decentralization of the enforcement of such rules as those which refer to wages, hours of employment, price and production control, and related matters.

5. *Is such an industry as the ready-mixed-concrete industry, whose operations are confined to metropolitan areas, eligible to formulate its code under the bill?* It is not only eligible, but conceivably the President, in order to achieve full stability in the construction industry, might order the industry to write a code of fair competition. The laundry industry is writing a code, and what could be more local in its operations than that business?

6. *As a general proposition, is not the bill so indefinitely drawn that industry is encouraged to submit a code of rules of fair competition without specific regard of the wording of the bill? In other words, is industry not expected to state what it thinks is necessary to attain, in its case, the objectives of the legislation?* Exactly; it is the job of the mineral-aggregates industry to declare itself. If certain practices need to be legislated out of existence, then say what they are, and go to the President with a determination to support very rule in the code.

7. *Will conflicting state anti-trust laws threaten the operation of the bill?* "This is a delicate question, but we do not believe they will be permitted to obstruct the operations of the National Industrial Recovery Bill; the same question arose in war times, and you know what happened."

8. *Can we prevent, at least during the present emergency, the operation of mineral-aggregates plants by states and subdivisions of government, as well as by contractors producing materials for their own use?* "This is another question hard to answer, but if the mineral-aggregates industries can show that they will be placed at a severe disadvantage by this form of competition, a way will be found to get around this problem." We might add to this the statement that this particular question is most vital to our industry. If it is not solved satisfactorily, our industry, operated under restrictions as to hours of employment and with fixed wage scales, would be victimized and not benefited by the National Industrial Recovery Bill.

The tentative code, in the form which will be considered at the Chicago meeting (not its final form) follows:

Tentative Code of Fair Competition for the Crushed-Stone, Sand-and-Gravel, and Slag Industries

ARTICLE I.

Preamble

SEC. 1.—This code of fair competition for the crushed-stone, sand-and-gravel, and slag industries, is submitted in behalf of the three industries by the National Crushed Stone Assn., the National Sand & Gravel Assn., and the National Slag Assn.

SEC. 2.—In the form in which it is finally approved by the President of the United States, this code of fair competition will become mandatory upon the crushed-stone, sand-and-gravel, and slag industries throughout the United States.

SEC. 3.—The National Crushed Stone Assn., the National Sand & Gravel Assn., and the National Slag Assn. are accredited representatives of their respective industries. They have been truly representative of their industries for fifteen years or more; they have been accepted as official spokesmen for their industries by every department and agency of the Federal Government whose work involves, in any degree, the crushed-stone, sand-and-gravel, and slag industries. The activities of these associations have touched upon every phase of their industries. Such activities have included engineering and economic research which has been of benefit not alone to member companies, but to the industries at large and the consuming public as well. These associations have imposed no inequitable restrictions on membership; no initiation fee has been charged; and all producers of the materials in question have been invited to become affiliated with the association of their industry.

SEC. 4.—Immediately upon the introduction of the National Industrial Recovery Act, the three associations, by means of the mail, through local meetings, and through concurrent meetings of their executive committees in Washington on June 1 and 2, acquainted their industries with the full significance of the legislation. Out of this procedure grew a tentative code of fair competition for the crushed-stone, sand-and-gravel, and slag industries. This tentative code was submitted to all producers of these materials, irrespective of their affiliation with the associations, substantially in advance of general meetings of the industries held in Chicago, Ill., under the auspices of the associations, on July 13 and 14. All producers were urged to study the tentative code carefully and to come to Chicago prepared to voice their criticisms and suggestions concerning the code as a whole or its individual provisions. The code which is now being submitted to the National Recovery Board represents the outcome of the discussions at the Chicago meeting. The code and the procedure followed in adopting it are in conformity with the spirit and letter of the National Industrial Recovery Act. Its approval by your board, in our opinion, will be in the interest of permitting our industries to shorten working hours, to furnish more employment, and to increase purchasing power.

SEC. 5.—Crushed stone, sand and gravel, and slag are basic building materials. With only a few exceptions there is no construction project which does not require the use of one or more of these materials—from the lowest type of improved road to the highest type of highway construction; and from the humblest home to the most majestic structure.

Among the principal uses of the products of these industries are the following: highway, street, and road construction; building construction; railroad ballast; (in the case of crushed stone) flux stone, agricultural limestone, rubble stone, riprap stone, asphalt filler, and other uses; (in the case of sand and gravel) foundry sand, abrasive sand and gravel, engine sand, filter sand and gravel, glass sand, and other uses; (in the case of slag) trickle filter medium, slag wool, agricultural slag, roofing granules, and other uses.

SEC. 6.—The unit value of crushed stone, sand and gravel, and slag is below that of other mineral commodities, but in terms of total value, the products of our three industries are exceeded only by bituminous coal, anthracite coal and pig iron. In 1931, the last year for which complete statistics have been published, the combined value of crushed stone, sand and gravel, and slag was approximately $173,000,000. This is more than half the value of anthracite coal or pig iron. By way of further comparison, the value of our materials was nearly double that of copper, more than three times that of gold, and almost twenty times that of silver. Preliminary statistics indicate that similar relationships existed in 1932.

Although less than half of the reported production of our materials is commonly shipped by rail, crushed-stone, sand-

and-gravel, and slag producers are among the principal users of the country's railroad facilities. During the five-year period from 1928 to 1932, inclusive, Class I roads derived approximately $400,000,000 in freight revenue from shipments of these materials. Further than this, our industries are substantial users of trucking and water transportation.

In 1929 contractors of the United States reported that 10.4 per cent. of all money expended for materials was spent for crushed stone, sand and gravel, and slag, our group leading all other materials of construction.

SEC. 7.—The crushed-stone, sand-and-gravel, and slag industries expanded to their present proportions in the years following the World War. There then ensued a period when perhaps the principal concern of the industries was to keep pace with the demands of their consumers, but in this rapid growth of our industries many were attracted to them by the feeling that they offered a sure road to easy and quick profits. So long as the demand exceeded the supply the ultimate complications could not be foreseen, and an immediate result of this was further investment in plant facilities without rational consideration of the market in the future and its ability to absorb the output. The rapid and progressive decline in all forms of construction (including public works) since 1929 has imposed upon us the problem of adjusting ourselves to production facilities far in excess of normal or potential requirements. Indeed, many new plants have been built and existing production facilities have been increased in the last three years.

SEC. 8.—The crushed-stone, sand-and-gravel, and slag industries reached the peak of their activities in 1929. Below we are presenting in tabular form the production of these materials, and their value, in the years from 1925 to 1932, inclusive. Crushed-stone and sand-and-gravel data are taken from reports of the U. S. Bureau of Mines; information as to slag production and value was furnished by the National Slag Assn. The data for 1932 are estimated, official figures not yet being available.

PRODUCTION AND VALUE OF CRUSHED STONE, SAND AND GRAVEL, AND SLAG FOR THE PERIOD 1925-1932, INCLUSIVE

Year	Sold or Used (short tons)	Value
1925	279,086,854	$214,434,795
1926	299,406,769	228,569,817
1927	325,061,361	240,717,498
1928	334,051,314	241,243,876
1929	350,777,648	257,798,195
1930	311,656,263	226,427,143
1931	244,854,319	173,200,530
1932	139,332,000	92,164,400

SEC. 9.—It will thus be seen that there has been a precipitous falling off in the production and in the value of these materials in the last several years. The combination of a rapidly-vanishing demand and a plant capable of producing even more than is required in normal times, brought on a destructive price competition which has exacted a heavy economic toll. Our industries found themselves no longer able to furnish steady employment; our businesses have been operated, as a general proposition, out of capital and not out of profit during the last year or more. We earnestly desire to discharge our responsibilities under the National Industrial Recovery Act of providing more jobs for workers and of paying them a wage consistent with decent standards of living; but if our industries are restrained from realizing the cost of production plus a reasonable profit, through continued exposure to cut-throat competition, and if the Federal Government withholds its permission for stabilization of our businesses in the manner proposed by this code of fair competition, then the public-works program, so far as our participation in it is concerned, will be little more than an inadequate substitute for "made work" and will not accomplish the objectives of the act; our employees will not benefit from stimulated purchasing power; employers will be compelled to make further inroads on their capital; and complete demoralization will be inevitable. Our industries are too basic to the construction industry, the second largest employer of labor in the United States, for a condition of this sort to be permitted.

SEC. 10.—Included in our code of fair competition are provisions for price and production control. They are essential to an improvement of our situation. We recognize that the National Recovery Board is not disposed toward giving industry permission, in unlimited terms, to control prices and to regulate production, and probably in some industries, price and production control is not desired; but in the case of such basic, natural-resource products as ours, with operations widely scattered all over the country, our industries entertain the conviction, in an overwhelming sense, that without some protection against new production in an already overcrowded field, and without adequate safeguards against disorderly prices arising from the desperate competition of the last three years, our efforts to stabilize ourselves under the National Industrial Recovery Act will be fruitless, not because of any lack of desire to coöperate with President Roosevelt in realizing the purposes of the legislation, but altogether because a code of fair competition without a reasonable provision for price and production control will be abortive in its effects. Our rules are thoughtfully drawn; they involve our very existence as a healthy industry able to contribute its part in the improvement of living standards in the United States. We earnestly seek their approval.

SEC. 11.—The quantity of crushed stone, sand and gravel, and slag produced by states, counties, and municipalities, has been increasing over the past five years. The exact magnitude of this trend can not be determined because reports have not been received from comparable sources each year. In 1931, according to data developed by the U. S. Bureau of Mines, approximately 32,000,000 tons of crushed stone and sand and gravel were credited to governmental agencies. This represented, in the case of crushed stone, about 10 per cent. of the total production, and in the case of sand and gravel about 16 per cent. of the total production. Some slag was produced by governmental agencies, but we have no definite figures in this regard.

It is absolutely essential to the complete success of our code of fair competition that the production of our materials by government agencies be discontinued wherever commercial materials are available. If our industries expose themselves through the operation of the code to higher production costs, thus increasing the existing disparity of costs due to the failure of such governmentally operated plants to make proper allowances for depreciation, depletion, taxes, and other charges involved in privately-conducted operations, our producers will be placed at a more severe disadvantage than even the present conditions impose. The practical effect of the code, therefore, would be an open invitation for all divisions of government to operate their own plants for the production of our materials. In this connection it should be remembered that the principal markets of our three industries this year will be public works, private construction, at least at this moment, being insignificant in its proportions. Under these circumstances the problem of governmentally-operated plants becomes especially acute, and we hope that the National Recovery Board will look sympathetically upon our difficulties in this regard and that it will take whatever steps will be necessary in bringing about, in this instance, a proper coöperation between the Federal Government and divisions of government with respect to production and use of our materials.

SEC. 12.—The crushed-stone, sand-and-gravel, and slag industries, acting through their respective national associations, pledge their coöperation with President Roosevelt in carrying out the purposes of the National Industrial Recovery Act.

SEC. 13.—This code is not designed to promote monopolies nor to oppress small enterprises, and it is not intended to operate or discriminate against such small enterprises. Under our proposed system of administration the voice of all established producers, regardless of size, will be heard, and they will have an active part in the shaping of policies and in the administration of the rules and regulations incorporated in this code of fair competition for the crushed-stone, sand-and-gravel, and slag industries.

ARTICLE II.

Definitions

SEC. 1.—*Crushed-Stone Producer.* As used in this code, a "crushed-stone" producer is considered to be an organization regularly engaged in the quarrying, crushing, and processing of stone for sale. Specifically not included in this definition is the occasional producer of crushed stone who

engages or proposes to engage intermittently in the crushed-stone business for the purpose of supplying materials, either for his own use or otherwise, for a specific construction project.

SEC. 2.—*Sand-and-Gravel Producer.* As used in this code, a "sand and gravel" producer is considered to be an organization regularly engaged in the recovery and processing of sand and/or gravel for sale. Specifically not included in this definition is the occasional producer of sand and/or gravel who engages or proposes to engage intermittently in the sand and/or gravel business for the purpose of supplying materials, either for his own use or otherwise, for a specific construction project.

SEC. 3.—*Slag Producer.* As used in this code, a "slag" producer is considered to be an organization regularly engaged in the recovery and processing for sale of air-cooled slag resulting from blast-furnace operations. Specifically not included in this definition is the occasional producer of slag who engages or proposes to engage intermittently in the slag business for the purpose of supplying materials, either for his own use or otherwise, for a specific construction project.

ARTICLE III.

Organization and Administration

SEC. 1.—*Administrative Regions.* For the purposes of administration the national associations sponsoring this code of fair competition have divided the United States into the seventeen administrative regions shown on the tabulation and map in Appendix I. Appendix I is hereby constituted a part of this code.

SEC. 2.—*Regional Subdivisions.* Each administrative region may be divided into regional subdivisions to facilitate the administration and enforcement of this code.

SEC. 3.—*Administrative Committees.* (a) *National Administrative Committee.* There is hereby established the National Administrative Committee of the crushed-stone, sand-and-gravel, and slag industries. This committee shall consist of one representative for each of the three industries governed by this code from each administrative region, selected by such administrative region, twelve representatives-at-large selected by the regional representatives on the committee, and six *ex-officio* members consisting of the presidents and one staff member of each of the national associations sponsoring this code.

(b) *National Control Committee.* The National Control Committee shall consist of nine members appointed by the National Administrative Committee, six of whom shall be the *ex-officio* members of that committee. Each of the three industries sponsoring this code shall have equal representation on the National Control Committee.

(c) *Regional Administrative Committees.* The producers in each administrative region shall establish a regional administrative committee by means of the voting procedure outlined in Sec. 6 (d) of Art. 3. This committee shall be equitably representative of the small, intermediate and large producing companies within the region, and of all the industries or branches of these industries joining in this code, with not more than one representative from a single company, and, provided further, that each industry or branch of these industries joining in this code shall have at least one representative on the committee.

SEC. 4.—*Duties of Committees.* (a) *Duties of National Administrative Committee.* This committee shall be the general planning, coördinating and administering agency for the crushed-stone, sand-and-gravel, and slag industries in carrying out the provisions of this code of fair competition. This committee is especially charged with the duty of formulating rules and regulations necessary for the administration and enforcement of this code, and, upon the complaint of interested parties or upon its own initiative, of making such inquiry and investigation as to the operation of this code as may be necessary. The committee may delegate any of its authority to the National Control Committee and may designate such other agents as it may determine.

If, within 30 days after approval by the President of the United States of this code of fair competition, any administrative region, or regions, herein provided for, fail to establish a regional administrative committee, or withhold their coöperation in the attainment of the objectives of the National Industrial Recovery Act, it shall be the duty of the National Administrative Committee to function as a regional committee in such administrative region, or regions, and to prescribe such rules and regulations as will insure compliance with this code of fair competition.

This section shall not be construed as denying the right of any producer or group of producers to appeal to the National Industrial Recovery Board.

(b) *Duties of National Control Committee.* This committee shall perform such functions as may be delegated to it by the National Administrative Committee, such as the enforcement of the provisions of this code, hearing and adjusting complaints, considering proposals for amendments and making recommendations thereon, approving recommendations for exceptions to the provisions of this code, and otherwise administering its provisions. Any individual or group operating under the provisions of this code or subject to its terms shall have the right of appeal to the National Administrative Committee from decisions of the National Control Committee and the decisions of the National Administrative Committee on such appeals shall be final, except for appeal to the National Industrial Recovery Board.

(c) *Duties of Regional Administrative Committees.* The duties of such committees shall be to administer the provisions of this code of fair competition in their regions, provided, however, that their actions shall be subject to the review of the National Administrative Committee.

SEC. 5.—*Inter-Regional Regulations.* Proposals in respect to interpretation and enforcement of this code affecting more than one administrative region may be made to the National Administrative Committee by the Regional Administrative Committee of any affected region and the decision of the National Administrative Committee shall be conclusive for the three industries governed by this code.

SEC. 6.—*Voting.* (a) *Voting by National Administrative Committee.* Each member of this committee shall be entitled to one vote, irrespective of the amount of production in the administrative region which he represents.

(b) *Voting by National Control Committee.* The regulations governing the voting of the National Administrative Committee shall also apply to the National Control Committee.

(c) *Voting by Regional Administrative Committees.* The regulations governing the voting of the National Administrative Committee shall also apply to the Regional Administrative Committees.

(d) *Voting by Producers Within an Administrative Region.* A meeting of the producers within an administrative region may be called at the instance of producers representing 25 per cent. of the number of companies within the administrative region, or producers representing 25 per cent. of the production within the administrative region. Each producer within an administrative region shall have one vote, and a sanctioning vote shall be considered as two-thirds majority of those voting, except that any action taken on which there is disagreement by producers (whether or not they have participated in the voting) representing either 25 per cent. of the number of producers within the administrative region, or 25 per cent. of the production within the administrative region (based on the average production for 1929 to 1932, inclusive) shall be reviewed by the National Administrative Committee, or its accredited representative, and the decision of the National Administrative Committee shall be final, except for appeal to the National Industrial Recovery Board. Notice of such disagreement shall be given the National Administrative Committee within 5 days after the action in question and such notice shall constitute an injunction against proceeding with the action in question.

(e) *Voting by Subdivisions of Regions.* A meeting of the producers within a subdivision of a region may be called by producers representing either 25 per cent. of the producing companies within the subdivision of the region, or 25 per cent. of the production within the subdivision of the region. The regulations governing the voting by administrative regions shall also apply to affairs within a subdivision of a region, except that disagreements, in the sense

outlined in Sec. 6(d) of Article 3, shall be reviewed by the Regional Administrative Committee.

SEC. 7.—*Arbitration.* Complaints or controversies, involving labor, the consuming interests, or other groups outside the producing industry which can not be satisfactorily settled by the National Administrative Committee shall be referred to an Arbitration Board composed of equal representation from each of the groups involved in the complaint or controversy, together with a neutral arbiter selected by the appointed members of the Arbitration Board.

SEC. 8—*Statistics.* All producers of crushed stone, sand, gravel, or slag shall file with the national association of the industry in which they are engaged such records as may be required by the National Administrative Committee with respect to production, stocks on hand, sales and such other information as may be necessary in the accomplishment of the objectives of this code.

SEC. 9.—*Monthly Affidavits.* All producers of crushed stone, sand, gravel, or slag shall submit to the national association of the industry in which they are engaged monthly affidavits properly executed before a Notary Public certifying that they have complied with the provisions of this code with respect to rates of wages, hours of labor and such other data as may be required. These affidavits shall be filed in the headquarters of the national association of the industry involved and shall be available at all times for inspection by the President of the United States or his authorized representative.

SEC. 10.—*Changes in the Code.* No recommendation to the President for changes in this code shall be made by the National Administrative Committee unless each producer of crushed stone, sand, gravel, or slag is given the opportunity to express his viewpoint upon the desirability of such change; and, further, no changes in the code shall be recommended by the National Administrative Committee without a sanctioning vote of the producers of crushed stone, sand, gravel, or slag involved.

SEC. 11.—*Administrative Expense.* (a) All producers engaged in the crushed-stone, sand, gravel, or slag industries shall bear their proportionate share of the expense incident to initiating, securing the approval of, and administering this code of fair competition. These funds shall be paid into the treasury of the national association of the industry in which the producer is engaged.

(b) Expenses incurred by the National Administrative Committee in the performance of its administrative duties shall be equitably distributed among the three associations sponsoring this code.

ARTICLE IV.

Hours of Labor and Rates of Pay

SEC. 1.—*Rights of Labor.* As prescribed by the act: (1) employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; (2) no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and (3) employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment approved or prescribed by the President.

SCHEDULE I

Administrative Region Number	States Included in Region	Range in Minimum Rates of Pay Per Hour*	
		High Living Cost Areas	Low Living Cost Areas
1	New England States		
2	N. Y. (including L. I.)		
3	Pa., N. J., Del.		
4	Md., Dist. of Col., Va., N. C.		
5	S. C., Ga., Ala., Miss., Fla.		
6	Ky. and Tenn.		
7	Mich. (lower pen.) Ohio, W. Va.		
8	Ind. and Ill.		
9	Mich. (upper pen.) Wis., Minn.		
10	N. D. and S. D.		
11	Iowa and Nebraska		
12	Mo., Ark., Kan., Okla.		
13	La. and Texas		
14	Colo., N. M., Utah, Ariz.		
15	Mont., Wyo., Idaho		
16	Wash. and Ore.		
17	Nev. and Calif.		

*These rates to be supplied in coöperation with producers from each administrative region at the general meeting of the three industries in Chicago, July 13 and 14. The staffs of the three associations have conducted studies of this question and will be prepared to make suggestions for rates in each administrative region.

SEC. 2.—*Hours of Labor.* With exceptions hereinafter set forth, no employee shall work more than 1,000 hr. per 6-months period, 175 hr. per month, or 48 hr. per week, or 8 hr. per day. The exceptions to the maximum number of working hours outlined herein shall be subject to approval by the National Administrative Committee and shall include emergency employment, occasioned by breakdowns and other factors beyond control, managerial employees and employees engaged in work where such maximum hours of employment create an impracticable condition, as in the case of boat crews, watchmen and other classes of employment designated by the Committee.

SEC. 3.—*Rates of Pay.* The minimum rates of pay per hour for common labor in the various portions of the United States shall be not less than as listed in Schedule I which is made a part of this code.

It is recognized that different economic conditions exist in various portions of the above designated areas which may require adjustments in the minimum rates of pay listed in Schedule I. Such adjustments may be made by the Regional Committees in coöperation with the labor involved, subject to arbitration proceedings as provided for in this code. Also, adjustments in the minimum rates of pay shall be made at quarterly intervals in accordance with the cost of living index figures published by the U. S. Department of Labor.

ARTICLE V.

Basis for Fair Selling Price

SEC. 1.—*Selling Below Cost.* No producer of crushed stone, sand, gravel, or slag shall sell his product below a reasonable average cost of production based on normal operations for his region.

SEC. 2.—*Uniform Cost Accounting.* The National Administrative Committee shall establish a uniform cost-accounting system and each producer of crushed stone, sand, gravel, or slag shall adhere to the uniform system adopted for the industry in which he is engaged, to the extent of incorporating in all calculations of costs all the elements outlined in the standard cost-accounting system.

SEC. 3.—*Uniform Terms of Sale.* All quotations and contracts for the sale of crushed stone, sand, gravel, or slag shall be in writing and shall contain a definite statement of price, quantity, terms of payment, time and place of delivery, and all other items necessary to form a complete understanding. The basis for the sale of crushed stone, sand, gravel, or slag, shall be the short ton of 2,000 lb., except that another unit of measure may be employed in any district in which such other unit is used exclusively.

SEC. 4.—*Uniform Credit Practices.* In each administrative region the Regional Administrative Committee shall establish credit practices, uniform within any subdivision of a region, which shall be binding upon all producers selling in that region.

SEC. 5.—*Absorption of Freight Rate Differentials.* In each administrative region the Regional Administrative Committee shall adopt standard practices, binding upon all producers selling in that region, with respect to the maximum differentials in transportation charges per ton which may be absorbed by any producer in meeting a delivered price.

SEC. 6.—*Price Stabilization.* In each administrative region the Regional Administrative Committee shall formulate plans for the determination of fair selling prices and all producers selling their products in that region shall adhere to such plans. Any such plans agreed upon within a region shall give due consideration to the average cost

of production and shall be subject to the review and approval of the National Administrative Committee.

ARTICLE VI.

Limitations on Plant Capacity and New Production

SEC. 1.—No new plant may be established or the facilities of an existing plant increased or a plant moved from one marketing area to another, without notice of such intent being given to the regional committee of the region in which the new production facilities are proposed to be located. Upon receipt of such notice the regional committee shall collect complete information concerning existing producing capacity in that area. If these data disclose that such new production or additional facilities will result in further increasing the problems of over-production in such area, the regional committee shall request the National Administrative Committee to petition the President, or his accredited representatives, to prohibit the construction and operation of the proposed new plant, or the increase in the facilities of existing plants or the movement of a plant from one marketing area to another.

ARTICLE VII.

Unfair Competitive Practices

SEC. 1.—*Secret Rebates.* No producer of crushed stone, sand, gravel, or slag shall make a secret prepayment of transportation charges or permit the payment or allowance of secret rebates, refunds, credits or unearned discounts, whether in the form of money or otherwise, or the giving of premiums, or extending to certain purchasers special service or privilege not extended to all purchasers of crushed stone, sand, gravel, or slag under like terms and conditions.

SEC. 2.—*Interference in Contracts.* No producer of crushed stone, sand, gravel, or slag shall wilfully interfere with any person, firm, corporation or association by any means or device whatsoever, in any existing contract or order between a seller and a purchaser in or about the production, manufacture, transportation, purchase or sale of the product handled by the industry or the performance of any contractual duty or service connected therewith, destroying or appropriating in whole or in part the patronage, property or business of another engaged in the crushed stone, sand, gravel, or slag industries.

SEC. 3.—*Defamation of Competitor.* No producer of crushed stone, sand, gravel, or slag shall defame a competitor by words or acts, falsely imputing to him dishonorable conduct, inability to perform contracts or questionable credit standing, or by the false disparagement of the grade or quality of his material.

SEC. 4.—*Conformity with Specification Requirements.* No producer of crushed stone, sand, gravel, or slag shall sell or offer for sale any product of the industries with intent to deceive customers or prospective customers as to the quality, quantity, size, grade or substance of such product.

SEC. 5.—*Misbranding.* No producer of crushed stone, sand, gravel, or slag shall mark or brand products of the industries for the purpose or with the effect of misleading or deceiving purchasers with respect to the quality, quantity, size, grade or substance of the materials purchased.

SEC. 6.—*Payment of Commission.* No producer of crushed stone, sand, gravel, or slag shall pay or promise to pay, to an employee of a customer or prospective customer, a commission or consideration of any character for the purpose of inducing, or compensating for, a sale.

SEC. 7.—*Commercial Bribery.* No producer of crushed stone, sand, gravel, or slag shall offer or give commissions, prizes, premiums, gifts or excessive entertainment as an act of commercial bribery to anyone in connection with the sale, purchase or use of his products, or as an inducement thereto.

SEC. 8.—*Lump-Sum Bidding and Contingent Selling.* (a) No producer of crushed stone, sand, gravel, or slag shall sell his product except on a unit price basis.

(b) No producer of crushed stone, sand, gravel, or slag shall enter into any contract for furnishing any of his products contingent upon the sale or purchase of any other thing, the performance of any other service, or any other contingency not appearing in the contract or complying with this code.

SEC. 9.—*Anti-Dumping.* Any producer of crushed stone, sand, gravel, or slag shipping his product into regions, or subdivisions thereof, outside that in which his plant is located shall not sell such material below the general market price prevailing in the region, or subdivision thereof, into which shipments are made.

SEC. 10.—*Enticement of Employees.* No producer of crushed stone, sand, gravel, or slag shall entice employees from a competitor for the purpose of interfering with his business.

SEC. 11.—*Accident Prevention.* Every producer of crushed stone, sand, gravel, or slag shall lend his coöperation and active support to the program of his association for the reduction of accidents in the conduct of his operations. No producer shall be permitted to expose his employees to dangerous working hazards, and cases of flagrant disregard of the life and health of employees shall constitute a violation of this code of fair competition.

SEC. 12.—*Employment of Convict Labor.* No producer of crushed stone, sand, gravel, or slag shall use penal labor in the production of his product.

SEC. 13.—*Enforcing Observance by Jobbers and Distributors.* No producer of crushed stone, sand, gravel, or slag shall permit his products to be handled by a middleman standing between producer and consumer who violates the provisions of this code of fair competition.

SEC. 14.—*Production by Governmental Units.* Wherever commercial production of crushed stone, sand, gravel, or slag is economically available, no state, county, municipality or other divisions of government shall produce these materials either for their own use or otherwise.

SEC. 15.—*Child Labor.* The minimum age for labor employed in the crushed stone, sand and gravel, and slag industries shall be sixteen years.

ARTICLE VIII.

Economic and Engineering Research

SEC. 1.—*Research Activities.* In order to increase knowledge of the properties of crushed stone, sand, gravel, and slag, for the purpose of preventing waste and of promoting the more economical production and use of these materials, with resulting benefit to the public, each of the national associations sponsoring this code shall, in so far as practicable, continue to engage in:

1. Scientific research into the properties of these materials.
2. Research into methods of production.
3. Research into methods of use.
4. Coöperation with governmental and other agencies for the purposes of standardization and simplification of these materials and their methods of production.
5. Surveys to assist planning for the purpose of promoting stabilization of these industries and avoiding undue economic fluctuations within them.
6. Such other investigations of a helpful nature as may be desirable.

Administrative Region Number	States Included in Region
1.	Maine, N. H., Vt., Mass., Conn., and R. I.
2.	New York (including Long Island)
3.	Pennsylvania, New Jersey and Delaware
4.	Md., Dist. of Col., Va., and N. C.
5.	S. C., Ga., Ala., Miss. and Fla.
6.	Kentucky and Tennessee
7.	Mich. (lower peninsula), Ohio and W. Va.
8.	Indiana and Illinois
9.	Mich. (upper peninsula), Wis. and Minn.
10.	North and South Dakota
11.	Iowa and Nebraska
12.	Missouri, Arkansas, Kansas and Oklahoma
13.	Louisiana and Texas
14.	Colorado, New Mexico, Utah and Arizona
15.	Montana, Wyoming and Idaho
16.	Washington and Oregon
17.	Nevada and California

(*Continued on page 50*)

Cementos Rezola Plant in Northern Spain Fully Rebuilt and Modernized

Adds Raw-Material Conveying and Blending System and Lepol Kiln

ONE of the most interesting cement plants in Europe is that of Cementos Rezola at San Sebastian, Spain, in the heart of the Basque country at the foot of the Pyrenees. This plant, which was recently completely modernized, was originally built many years ago to manufacture natural cement but was later equipped to produce Portland cement by using a battery of 6 hand-operated vertical kilns, which some years later were replaced by 3 vertical automatic Andreas kilns with a daily capacity of 410 bbl. each. In 1931 a new Lepol rotary kiln with a capacity of 1,300 bbl. of clinker in 24 hr. was added and a complete Fuller-Kinyon conveying and blending system was installed for the raw material.

Raw Material.—The raw material is obtained from three quarries near the plant. The composition of the stone from these three quarries is as follows:

	Arrobieta Shales (*per cent.*)	Amazorrain Shales (*per cent.*)	Andosin Limestone (*per cent.*)
Loss in Burning	32.67 to 36.75	38.38	43.38
SiO_2	17.65 to 10.23	9.09	1.02
Al_2O_3	6.34 to 4.00	1.82	0.30
Fe_2O_3	2.56 to 2.00	1.14	0.22
CaO	39.20 to 46.00	48.40	54.90
MgO	0.69 to 0.68	0.42	0.20
SO_3	0.24 to 0.24	0.38	
$CaCO_3$ (average)	72.00 to 77.00	86.00	98.00

The stone from the near Arrobieta quarry is brought to the plant by an aërial tramway. The stone from the other two quarries is received in narrow-gage railroad cars. Stone is crushed in a primary Titan crusher driven by a 200-hp. motor and is then stored in a battery of 14 silos. The company is now contemplating the use of trucks for the quarry operations.

From the silos the stone is withdrawn by belt-conveyors, and two bucket-elevators discharge it to one of two secondary crushers, whence the stone is fed by bucket-elevators into one of two rotary driers. By means of a Skipulter conveyor the dry stone is carried to an elevator and to another Skipulter which delivers it into 7 dry-storage silos. Each Skipulter is driven by a 15-hp. motor.

These silos are provided with feeders that allow a certain proportioning of the stone while it is being withdrawn to a belt-conveyor. A bucket-elevator then takes the stone to another belt-conveyor which discharges into hoppers over the raw-material mills.

Raw-Material Grinding. — The raw-material-grinding plant consists of a battery of 3 Lohnert 2-compartment tube-mills, 6 ft. in diameter and 26 ft. long, individually driven by 250-hp. motors. The capacity of each mill is about 7½ tons per hr. A new Smidth Unidan mill, 6½ ft. in diameter, 40

Rear view of the Rezola plant showing Lepol kiln in open building and blending tanks at the right.

ft. long, and driven by a 600-hp. synchronous motor, was also recently installed. This mill has an output of 17½ tons per hr. Therefore, the total capacity of the grinding plant is about 40 tons per hr. The pulverized raw material from the Lohnert mills is gathered in a screw-conveyor and the material coming from the Unidan mill by another conveyor, both delivering into a common screw-conveyor, at the end of which there is a wrapped screen. A collector screw located underneath feeds a Fuller-Kinyon pump.

The Fuller-Kinyon installation consists of an 8-in. type B stationary pump with a 5-in.-diameter transport line. This pump requires approximately 25 hp. and uses about 200 cu. ft. of air per min. at a pressure of approximately 25 lb. at the ring.

The Fuller-Kinyon transport line is buried underground for a distance of 130 ft. and then rises vertically 65 ft. to the tops of the raw-material-blending silos, where it has a run of 65 ft. The total pumping distance is therefore 260 ft. By means of 2-way valves, electro-pneumatically-operated, the raw material is distributed and blended into any one of the 8 silos.

Blending System.—The operation of the Fuller-Kinyon blending system is entirely directed from a control-board located in the chemical laboratory. A timing unit which can be set at will regulates the flow of raw material into each bin in a certain sequence and for a period of time desired, this usually being about 2 min. for each silo. At the given time intervals the valves on the transport system over the silos are thrown in the desired position and material is delivered into each one of the silos, where, due to the aëration typical of the Fuller-Kinyon system, the raw material spreads out in a very thin horizontal layer. The thinness of the layers and the rat-holing effect that takes place when withdrawing material from the bottom produces a certain mixing of the contents of each silo. The valves are operated electrically, the current passing through the control-board and energizing a solenoid on each valve, which opens a pilot valve. This allows compressed air to enter the operating cylinder and throws the Fuller-Kinyon valve into the required position.

The position of each valve is shown at all times by indicating lights on the control-board, where a diagram of the actual installation is shown. The board also shows at all times where the raw material is being delivered. Any valve can be closed and sealed at will from the control-board by means of an individual switch, and in that case the particular silo will be skipped in the blending cycle. This allows the chemist to set aside any silo in which the raw material has the desired composition. The system works so effectively that the company's tests show an error of less than .01 per cent., plus or minus, in the CaO content of the raw material.

Compressed air for the operation of the Fuller-Kinyon pump, electro-pneumatic units and other plant requirements is furnished by a Winterthur rotary compressor, Type 70-40, having an actual delivery of 375 cu. ft. per min. at 100-lb. pressure. It is driven by a 100-hp. motor. An air receiver, which at the same time is a moisture trap, is located near the compressor.

Side view of building housing the kiln.

The blending idea is carried further by proportioning while withdrawing the raw material from the 8 silos. This is done by means of feeders delivering to one central screw-conveyor running under the center line of the group of silos.

The composition of the blended raw material follows:

Loss by ignition	35.36 per cent.
SiO_2	13.65 per cent.
Al_2O_3	4.71 per cent.
Fe_2O_3	1.69 per cent.
CaO	43.68 per cent.
MgO	0.88 per cent.
Alkalies	0.03 per cent.
	100.00

The Vertical Kilns.—A series of elevators and conveyors take the raw material either to the Andreas kiln building or to the Lepol kiln building. There are three Andreas kilns, each having a maximum capacity of 94 tons of clinker, or an average of 70 tons in 24 hr. The Andreas kiln consists of a vertical shaft having two rows of ports through which air is injected. The shaft proper is about 33 ft. high, has an inside diameter of 8 ft. 2 in., and is lined with fire-brick. The bottom is an inverted cone, inside which a grate rotates constantly at slow speed. This grate is driven by a 7½-hp. motor through a speed-reducer. Under the grate is a spout provided with three discharge gates to form an air lock and prevent cold air from entering the kiln while the clinker is being discharged. These

three gates are operated by a 3½-hp. motor. The top of the kiln is conical and has an opening in the center through which the kiln is fed. There is a rotating distributor to spread the feed evenly all around, this distributor requiring a 3-hp. motor for its operation. Each kiln has its individual fan operated by a 75-hp. motor. The air is blown at two different levels all around the shaft and also at the grate section.

The feed must be specially prepared prior to entering the kiln. For this purpose each kiln has its own mixer, consisting of a trough with paddles or beaters. The raw material is accurately weighed for each batch and the correct amount of coal is weighed separately. The proportions are about 154 to 176 lb. of raw material and 22 to 26 lb. of coal for each batch. The coal and raw material are elevated to the kilns and a small amount of water, amounting to about 10 per cent. by weight, is added in the mixer. Each mixer requires a 60-hp. motor. At the far end of the mixer is a vertical plate having a series of 1½-in. holes. The plastic material after being mixed is forced through these holes in the end plate and comes out in the shape of short cylinders and in this form it is fed into the kiln.

The clinker in each kiln is discharged to a separate elevator for delivery to storage. Each kiln requires one man to run the mixer, one man to weigh the materials and one man at the grate or a total of nine men for the three kilns plus one foreman per shift.

The Lepol Kiln.—In Spain, where labor was cheap and coal expensive, the Andreas kilns were a wise investment at the time they were installed, but as labor rates went up and very high quality cement was demanded, it was decided, when the plant had to increase its capacity, that some other type of kiln should be installed. The main consideration was the coal consumption, and although waste-heat boilers were considered in an effort to reclaim part of the heat lost in a rotary kiln, the idea was abandoned and after a careful study it was decided to install a Lepol kiln, which is manufactured by the G. Polysius A. G., Dessau, Germany.

View of Lepol kiln looking toward grate.

The principle of the Lepol kiln consists of making the waste gases from the kiln pass through the raw material, which is previously prepared in the form of nodules, before it is fed to the kiln. The nodules must be sufficiently hard so they will not break and so that a layer of them will present voids through which the gases can pass. The nodules are formed in a nodulizing drum which is fed at a uniform rate from a supply bin, where the pulverized raw material is constantly renewed to keep a uniform head. Water in the shape of drops is injected in the nodulizing drum and the small balls of raw material or nodules are thus formed. The nodules are fed to a traveling grate to form a layer of uniform thickness. As the grate moves slowly forward an exhauster sucks the hot gases from the kiln and through the layer of nodules. There are two zones in the grate, the drying zone and the precalcining zone, the latter one being nearest the kiln. The kiln proper is much shorter than the ordinary rotary kiln and a rotary cooler is used under it.

Nodulizing.—At the Rezola plant the raw material from the blending silos is brought by a screw-conveyor and an elevator to a raw-material storage-bin, under which is a double-screw feeder that takes the material to an elevator 72 ft. high. This elevator discharges into a screw-conveyor over the raw-material supply bin. The overflow spout at the end of this conveyor takes the excess material back into the main bin, the idea being to keep the supply bin always full so that there is a uniform head of material. From the supply bin the raw material is fed through a rotary feeder into the nodulizing drum.

This drum is 8 ft. 2 in. in diameter, 10 ft. long, and is set at a slight slope. It rotates at about 14 to 15 r.p.m. and is driven by a variable-speed 35-hp., a.-c. motor. Inside the drum is a horizontal spray pipe through which the necessary water is introduced. The proportion of water to raw material is about 10 per cent. by weight. The drum is equipped with inside projections or fins to keep the material rolling and also with a scraper arrangement to prevent the material from sticking to the sides. One man takes care of the drum and it is his duty to see that the amount of material and water is correct so that the nodules formed are of the right consistency and size. Defective nodules can be by-passed back to the raw-material stream or can be thrown out of the system. If the nodules are right, they are allowed to pass into the traveling grate.

This grate has a length of 33 ft. and is 13½ ft. wide. It is composed of cast-iron grate bars and chains of cast steel. At the top part of the travel these units form a solid floor but at the bottom part they collapse and follow the shape of the guiding

rollers. Over the grate is a housing of plate lined with refractory bricks. This housing is divided crosswise into two chambers by a vertical baffle. The part nearer the kiln is the precalcining chamber and that nearer the nodulizing drum is the drying chamber. The passage of the gases from one zone to the other is controlled by baffles so that the correct draft is maintained in each chamber. Over the grate housing is a secondary stack which is used only when the kiln is being started, and during normal operation is cut off by a damper.

The correct thickness of nodules on the grate is maintained by a scraper having rake-like prongs which keep the nodules loose over the grate. The thickness of the layer in this grate is about 6 to 7 in. The grate is driven through a speed-reducer by a 5.2-kw. variable-speed d.-c. motor. The grate travels at the rate of 3 ft. per min. and its speed can be controlled from the firing end of the kiln by the burner. The very small amount of material lost through the grate is collected in hoppers and taken back to the boot of the raw-material elevator by a screw-conveyor.

Burning.—From the precalcining zone the nodules, now quite hard, pass into the kiln. This is a Polysius rotary unit 105 ft. long and 9 ft. 10 in. in diameter, supported on three sets of rollers having forged-steel shafts. The rings are of cast steel. The supports have oil chambers and automatic lubrication and are water-cooled. There is one horizontal thrust roller. The kiln is driven through a speed-reducer by a 40-hp. variable-speed a.-c. motor. Its output is about 1,300 bbl. in 24 hr.

From the kiln the clinker passes through a water-jacketed chamber lined with fire-bricks into a Polysius rotary cooler located underneath. This cooler is 65 ft. long, 7 ft. 7 in. in diameter, and is driven through a speed-reducer by a 20-hp. motor. It is provided with lifters and chains. The discharge end is open and has perforations around the periphery for screening the clinker as it is discharged to a ribbon-conveyor. This conveyor consists of a cylinder 33 in. in diameter and 96 ft. long, mounted on rollers and provided with a spiral welded to the inside face of the cylinder. It is driven by a 7½-hp. motor. Air is sucked through both ends of this conveyor by an exhauster connected to a chamber located about midway between the ends. This arrangement cools the clinker considerably while it is being conveyed. The exhauster is driven by a 15-hp. motor.

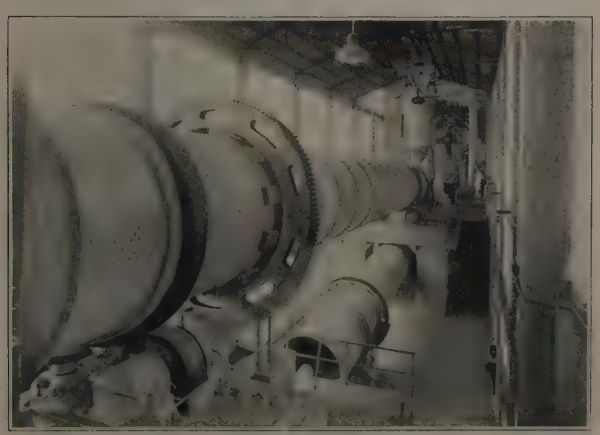
From the conveyor the clinker passes into an elevator provided with a swivel spout through which it is discharged to storage.

Kiln Control.—The draft in the kiln and grate is controlled by an exhauster driven by a variable-speed, 150-hp. a.-c. motor. This is a slip-ring machine and the ring is turned by a small d.-c. auxiliary Servo motor operated by remote control from the firing end of the kiln. The exhaust intake is connected to the side of the grate housing by two ducts, one located under the grate in the precalcining zone, and the other under the grate in the drying zone. In this way the gases are forced to pass through the layer of nodules and then through the grate before they are exhausted. Dampers regulate the correct amount of draft. Hoppers collect any dust that is entrained through the grate. This is a very small amount because the nodules are compact and free from dust. For this reason the stack gases are very clean.

In addition to the operator at the nodulizing drum there is a burner at the firing end of the kiln and one other man to do general oiling. The third man is not employed specially for the kiln but also attends to other duties. In all, three men per shift are required and they can operate 2 or 3 kilns as easily as one if the kilns are in a row. The kiln burner controls from his end the d.-c. motor driving the grate, the d.-c. motor driving the pulverized-coal feeder, the a.-c. slip-ring motor driving the main exhauster, the a.-c. variable-speed motor driving the kiln, and the a.-c. variable-speed motor driving the coal blower.

The power consumed by the Lepol kiln and its accessories, excluding coal-grinding, follows:

Nodulizing drum	18.5 kw.-hr.
Grate	3.5 kw.-hr.
Kiln	20.0 kw.-hr.
Cooler	12.0 kw.-hr.
Coal blower	13.5 kw.-hr.
Exhauster	42.0 kw.-hr.
Total	109.5 kw.-hr.



View of Lepol kiln and rotary cooler from feed end. Pulverized coal tank in background.

Filter of coal-grinding system (left) and blower which feeds coal to kiln (right).

This amounts to about 2 kw.-hr. per bbl. of clinker produced.

The clinker storage is 310 ft. long, 56 ft. wide, and is entirely closed and covered. It is equipped with a Demag traveling crane having a 1½-ton clam-shell bucket. This crane distributes the clinker and also reclaims it into hoppers over the finishing mills.

Gypsum is ground and fed to hoppers over the mills in a separate stream.

Clinker Grinding.—There are two new Smidth Unidan mills 6½ ft. in diameter and 40 ft. long, each driven by a 600-hp. synchronous motor. Each mill has an output of 60 bbl. per hr. These mills are arranged so that one of them can also be used as a raw-material grinding mill if desired.

The standard Rezola cement normally has the following composition:

SiO_2	21.40 per cent.
Al_2O_3	6.53 per cent.
Fe_2O_3	2.54 per cent.
CaO	64.65 per cent.
MgO	1.47 per cent.
SO_3	1.51 per cent.
Loss	0.60 per cent.
Ratio	2.36 per cent.

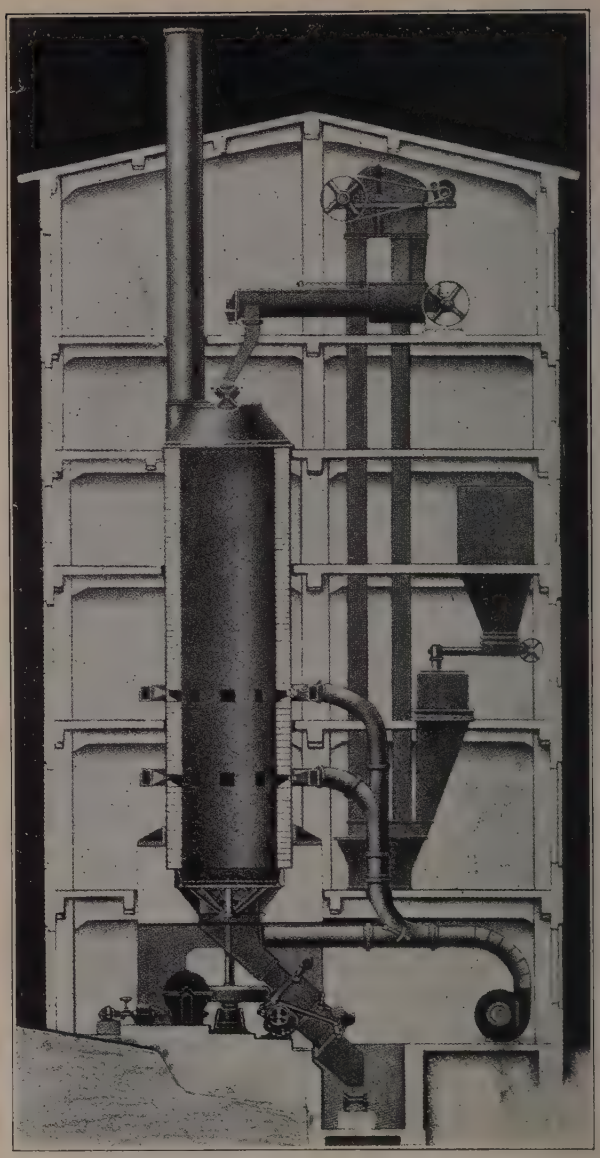
The fineness of the cement averages about .3 per cent. residue on the 900-mesh screen (75-mesh of the American standard), and 7.0 per cent. residue on the 1,900-mesh screen (175-mesh of the American stand).

Cement Storage.—A screw-conveyor collects the cement from the mills and takes it to an elevator which delivers it into another screw-conveyor over the storage silos. There are 7 cement silos in a row, each one having two 3-ft. by 3-ft. hopper openings in the bottom. Withdrawal from the silos is controlled by feeders under each opening. These feeders consist of a double screw of small pitch and of 10-in. diameter, with a common hopper under the opening and a separate barrel, having a length of about 5 ft. for each screw. The feeders discharge into two parallel screw-conveyors and they are driven from a common countershaft at a speed of 8 to 9 r.p.m.

The two collector screws under the silos deliver to a common bucket-elevator, which can feed either a separate screw-conveyor over the silos when recirculation of the cement is desired, or a conveyor which supplies the packer bins.

There is one packing machine to load wooden barrels, this form of shipment being used considerably for delivery to dealers and customers along the northern coast. The company owns two steamers of 2,000- to 3,000-bbl. capacity for this coastal trade. The barrel-packing machine has a capacity of 60 bbl. per hr. and all the barrels are made at its cooperage plant. There are also two packers for cloth and paper bags. The use of paper bags manufactured in Spain is beginning to find favor in that country. Bulk cement has not been used as yet, dealers and users not being equipped to handle it or to store it.

The plant is about 3 mi. from the city of San Sebastian, and although some of the cement is trucked, most of it is loaded into railroad cars and transported either by a main trunk railroad or an electric interurban line which passes the plant. The steamers are loaded at the docks from these cars. All switching is done with steam locomotives belonging to the Rezola company.



Diagramatic view of one of the Andreas kilns.

Coal is brought by railway from the mines of northern Spain and is deposited in storage by a clam-shell bucket on a traveling crane. This crane also distributes the coal and reclaims it into a bin over a screw-conveyor. Bituminous coal and anthracite are used in proportions of two to one. This plant uses screenings principally. The screw-conveyor takes the coal either to the Andreas kiln building, where it is used directly as already explained, or to the Lepol kiln building.

Coal-Handling.—The coal-operation plant for the Lepol kiln was built by G. Polysius A.G. of Dessau, Germany. The coal is brought from storage to a bin provided with a plate feeder, from which it

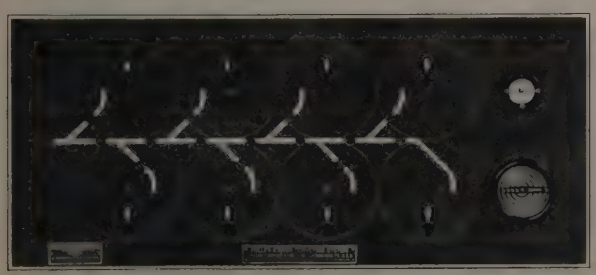
passes to a drier, which is 39 ft. long and 4 ft. in diameter and is arranged for indirect hand-firing. The dry coal is discharged into an elevator and stored in an overhead bin. The discharge from this bin is also provided with a plate feeder that takes the coal to a weighing device known as a Balan scale, consisting of a pocket feeder suspended on scales. The weight of coal passing through the feeder is recorded in a graph as follows. The beam of the scale carries an articulated arm provided with a pen and a roller counter. As the weight of the coal acts on this beam its recording end changes the position of the roller counter on the revolving plate on which it runs. This plate carries the graph. The counter works on the principle of a planimeter and the change in slippage, due to the angle between the roller and the plate, gives the change in the readings.

From the scales the coal passes into a Polysius Solo tube-mill, 3 ft. in diameter and 23 ft. long, driven through a speed-reducer by a 100-hp. motor. The mill is air-swept, the air being sucked through a cloth filter by an exhauster driven by a 15-hp. motor. The pulverized coal discharged from the mill and collected by the filter is discharged to a system of screw-conveyors and is carried into an elevator which feeds the pulverized-coal storage-bin. This bin is provided with a rotary feeder driven by a 3-hp., d.-c. motor.

The pulverized coal is fed into the stream of high-pressure air produced by a blower of the positive-pressure type which has a capacity of 1,270 cu. ft. per min. The mixture of air and coal is blown into the kiln through a 6-in. pipe, the length of the burner inside the kiln being easily adjustable. Secondary air for combustion is taken in by natural draft.

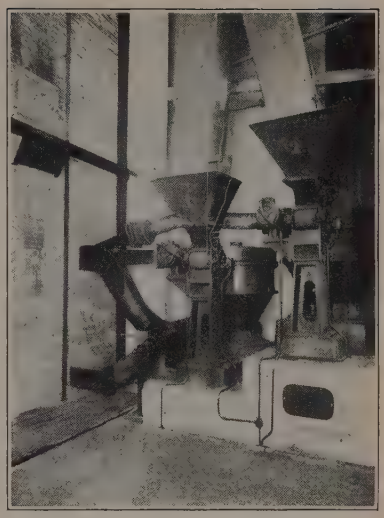
The power used in the preparation of the coal amounts to 23.2 kw.-hr. per ton of coal or about 0.52 kw.-hr. per bbl. of clinker produced. Using coal having a B.t.u. value of 12,870, the weight of dry coal burned is about 12 to 13 per cent. of the weight of the clinker produced.

Electric Power.—Electric current at this plant is 3-phase, 50-cycle. The motor-generator set for producing the direct current necessary to run some of the motors on the Lepol kiln installation is capable of developing 163 amp. at 125 b. hp. and is ample for a second Lepol kiln when the plant expands in the future. At that time the Andreas kilns will probably be discarded and two Lepol kilns, having a total capacity of 2,600 bbl. in 24 hr., will be used. The rest of the present plant has been figured for this ultimate capacity.



Control-board for the Fuller-Kinyon conveying system.

The electric power necessary to operate this plant is generated in two hydro-electric power plants owned by the company and located within 50 mi. of the plant. However, due to the low water condition of the river during part of the summer months, and the natural curtailment of power thus brought about, an auxiliary thermoelectric power-station, hooked up to the high-voltage line from the hydro-electric stations, was recently installed. This thermoelectric plant is located about 10 mi. from the cement plant and is capable of generating 1,400 kw.-hr.



Coal-pulverizing mills in generating plant, showing feeders and secondary-air pipes.

Coal Pulverizing.—Consideration was given to a Diesel engine but after a thorough study a steam turbine was adopted because of the fact that Spanish coal could be used in this type of station while oil would have to be imported. Pulverized coal was decided upon because of the economy and because it allows the use of a poor grade of Spanish coal. Coal of 30 per cent. ash has been burned in this installation and anthracite with 4 per cent. volatile matter has also been used. However, for practical purposes coals with a maximum of 25 per cent. ash and a minimum of 12 per cent. volatile matter are being used. Another feature of the pulverized-coal installation is the fact that the fuel is much easier to fire and much quicker to get the plant on the line, a very important consideration in an auxiliary power station.

The installation uses the Duffield patents on pulverized coal. The system consists of two Duffield pulverizers having an output of 2,200 lb. per hr. each. They are of the impact type and each is driven by a 30-hp. vertical motor mounted on the base of the mill and operating at 1,450 r.p.m. The pulverizers are swept by a stream of air produced by a fan direct-connected to a 20-hp. motor. Hot air can be sucked by the fan when very wet coal is used and it is desired to dry it while pulverizing. The air is controlled by dampers at the base of each mill. The top of each mill is provided with a fan that blows the pulverized coal directly into the combustion chambers. Each mill has its separate burner and either one alone can run the boiler at 75 per cent. of its total rating if necessary.

The coal is blown tangentially into the combus-

(*Continued on page 36*)

Lime Industry Adopts Fair-Competition Code at Atlantic City Meeting

Forty-Eight-Hour Week and Thirty-Five-Cent. Hourly Maximum Approved

ACTING under the provisions of the National Industrial Recovery Act members of the lime industry met at the Haddon Hall Hotel in Atlantic City, N. J., June 28 and 29 to prepare a code of fair competition for submission to the President. If approved by the President the code becomes a part of the law and is enforceable in the courts.

For weeks before the opening session of the industry conference, members of the Trade Relations Committee of the National Lime Assn. had been working to draft a code to be submitted to the conference. The final meeting of the committee did not complete its draft until after the scheduled opening of the conference. Consequently the conference was delayed until the afternoon of June 28.

Bernard L. McNulty, chairman of the Trade Relations Committee of the National Lime Assn., opened the conference and was immediately elected chairman of the conference. W. V. Brumbaugh, assistant secretary-treasurer of the association, was elected secretary of the conference.

Chairman McNulty then spoke briefly on the history of trade practices and described the efforts of the association in the past in coöperating with the Federal Trade Commission. He introduced as the next speaker Norman G. Hough, president and general manager of the association, who outlined briefly the high points of the code as submitted by the Trade Relations Committee and described the means by which the committee arrived at the code as submitted. Copies of the committee's recommendations were distributed to the members of the industry.

Abram F. Myers, counsel for the committee, spoke on *Conforming to the New Law*. He called attention to the fact that such meetings as this are unique in the history of the United States. For all practical purposes the conference was a body with power to legislate equal to the power of the Congress of the United States. The exception lies only in the inability of the conference to override a presidential veto.

The trade association has become the basis of government action, he said. Through it the government will control industry and will attempt to correct the evils which brought about the depression. Unless the National Industrial Recovery Act is effective Mr. Myers predicts socialization of industry to an extent unheard of at the present time.

He explained the effect of the act in making the anti-trust laws inoperative as soon as the code is approved. And again he reminded the industry that the purpose of the code is to stabilize prices, raise wages, and spread employment. In closing he mentioned the federal appropriation of $3,300,000,000 with which the government will provide the needed stimulus to industry. Every dollar of this huge sum is earmarked, but there will remain competition between competitive industries and products.

Mr. Hough was called on to read the code as submitted by the Trade Relations Committee. Then the serious business of adopting the code paragraph by paragraph began. Each clause was read and discussed. All members were invited to comment on each subject as it was read. Changes were made upon majority vote of the conference. Many companies, unable to be represented at the conference, sent proxies in order to have a voice in the action which will effect such vital changes in the industry.

With only a brief adjournment for dinner, the conference was carried well into the night only to resume early the next morning to complete its job. Finally a code was completed and adopted without a dissenting vote. The industry had arrived at a complete agreement. Only on one or two minor points did any of the members reject the action of the majority.

A minimum wage for the industry was adopted. Owing to the difference between living costs in the North and South, the minimum wage in the North is to be 35 c. per hr. while the rate in the South is to be 25 c. per hr. Maximum working hours in the industry are set at 48 per week with the privilege of averaging it over a six-months period to allow for the seasonal nature of the industry.

For purposes of administering the code the United States is divided into districts. Large powers are left under the code to individual districts in fixing base prices according to costs. Under the code, when approved by the President or his agent, it will be illegal to sell below the cost of production except to meet an established delivered market price.

A closely-defined list of unfair practices and unfair methods of competition was drawn up in the code. With presidential approval of the code these practices become illegal and can be prosecuted in the courts. Herein lies the difference between a code as drawn under the National Industrial Recovery Act and codes of ethics adopted by trade associations in the past. While before such associations could condemn these practices, enforcement other than by moral influence was impossible.

Members of the conference were enthusiastic over the adoption of the code. Many expressed great confidence in its effect toward putting the industry on a sound and profitable basis. Differences between competitors were forgotten in the hope that the ills from which the lime industry and other

large industries have suffered in the past will be entirely corrected.

The cost of administering the code will be borne by the entire industry prorated according to the production of the individual companies. The National Lime Assn. is empowered to act as the agent of the industry in collecting the assessment.

Considerable authority in administering the code is placed in the hands of the Trade Relations Committee of the association. It is expected that the mechanics of setting up the code and putting it into effect, when it is approved by the president, will be left largely to this committee. The Trade Relations Committee is composed of the board of directors of the National Lime Assn.

The code of fair composition approved by those attending the lime conference follows:

Code of Fair Competition submitted by The Trade Relations Committee of the National Lime Association, Washington, D. C.

Section I

The Parties

This code is submitted by the National Lime Assn., a trade association incorporated under the laws of the District of Columbia, for and in behalf of the lime industry of the United States to effectuate the policy of the National Industrial Recovery Act. A copy of the articles of incorporation and constitution and by-laws is attached to this code.

The lime industry is composed of manufacturers of various types of lime and lime products located in the various states of the United States engaged in producing and shipping lime and lime products competitively in interstate and intrastate commerce for use in construction, agriculture and process (chemical) industries.

Statistics compiled by the Bureau of the U. S. Department of Commerce give the following facts relating to the lime industry for the year 1931 (the last year for which complete figures are available):

1. 309 individuals, firms or corporations were engaged in the manufacture and sale of 2,707,614 tons of lime.

2. 48 manufacturers (15.5 per cent. of the total number of 309) sold 2,030,710 tons of lime, or 75 per cent. of the total tonnage of the industry.

3. 93 manufacturers (30 per cent. of the total number of 309) sold 2,436,753 tons of lime, or 90 per cent. of the total tonnage of the industry; on the other hand, 216 manufacturers (70 per cent. of the total number of 309) sold but 270,761 tons of lime, or only 10 per cent. of the total tonnage of the industry.

4. Also, 106 manufacturers (34.5 per cent. of the total number of 309) sold 17,323 tons of lime, or only 0.64 per cent. of the total tonnage of the industry.

On the date of the submission of this code, the association was composed of ——— manufacturers of all classes, producing upwards of ——— per cent. of the total output of lime in the United States.

The National Lime Assn., which was organized in 1899 and incorporated in 1922, is the only national organization of the lime industry. Its membership is a truly representative group within the meaning of the National Industrial Recovery Act.

Moreover, this code was formulated and agreed to at an open meeting held at Atlantic City on June 28, 1933, to which all lime manufacturers, non-members as well as members, were duly invited. The representatives of ——— concerns, controlling ——— per cent. of the tonnage, approved the code in the form now submitted.

The National Lime Assn. imposes no inequitable restrictions on the right to membership therein, and the Administrator of the National Industrial Recovery Act is hereby informed that any lime manufacturer who will conduct his business in conformity with this code will be welcomed to membership.

Section II

Competitive Conditions

Lime is a bulky, perishable commodity of relatively-low value. Intense competition exists between the several manufacturers and distributors of lime because, even in normal times, the productive capacity of the industry for most standard grades is in excess of the demand therefor. This condition has been aggravated by the sharp falling off in the demand for lime in recent years due to the ravages of the depression. To a considerable extent the fortunes of the lime industry rise and fall with construction, and construction has declined from an index (based on 1913) of 222 in 1926 to 58 in 1930, and an average of 31.2 for the first four months of 1933.

In addition to the intense competition within the industry, lime is highly competitive with numerous other products in all branches of distribution.

These conditions have resulted in unfair competitive practices that have demoralized the lime business and seriously affected employment and working conditions therein. Some of these practices are:

1. The refusal of many manufacturers to assume their fair proportionate share of the burden of the promotional and distribution costs of the industry.

2. Business taken by reducing selling prices by the amount of proper average allowance for sales expense, thus securing volume by supplying a demand that has been created by sales expenditures of competitors.

3. By dumping excess production below cost in primary markets of competitors to absorb a part of fixed charges.

4. By dumping so-called by-products, at or below prime manufacturing costs, in competition with major products of competitors.

5. Confusion resulting from impossibility of determining delivered market prices of competitors, due to the trucking of lime and the wide variation in trucking rates.

6. Abuse of sound practice in distributing lime products through dealers; by direct truckload delivery from plant to consumer in retail lots at wholesale prices.

7. Confusion resulting from lack of standardization of terms and discounts.

Section III

The Problem of Cost

The basic evil of the business at the present time consists in selling lime or lime products below cost. It has resulted in the destruction of fair-wage standards, has added greatly to the unemployment problem, and is the fundamental cause of the insolvency of many lime manufacturers.

During the past two years lime prices have fallen far below the combined cost of manufacture and distribution and in many instances below the prime cost of manufacture. Unfortunately "cost" in the lime business too often is defined to include only the prime manufacturing cost, without due allowance for such important items as plant overhead, fixed charges, depreciation, depletion, etc. Prime costs are, or can be, easily determined by the use of a standard cost-accounting system. However, the average costs of management, selling, promotion and distribution are the most difficult to ascertain and apply, particularly in a seasonal business, where costs on a unit basis are many times higher in the inactive season than in the active season.

Even in times of good demand the factors heretofore noted have prevented the maintenance of prices on a level sufficiently high to permit of the accumulation of reserves to enable the industry to maintain wage scales and avoid capital losses during periods of low demand. These factors, more especially the conditions of uncontrolled competition, necessarily give rise to high overhead costs per unit of production for such items as management, selling, promotion and distribution. These items of overhead expense amount to from 50 to 100 per cent. of the manufacturing cost.

Unless and until the lime industry can arrive at a satisfactory method of computing average costs, and can compute these into a minimum selling price fair alike to the public and to the industry, the lime business can not be stabilized or labor afforded the protection which it is the purpose of the National Industrial Recovery Act to provide.

For the purposes of this code cost is defined as the total expense borne by the manufacturer in producing and selling lime. In addition to total manufacturing costs, including depreciation, depletion, packages, raw materials and transportation thereof, it shall also include adequate allowances for sales, distribution and management costs, including promotion, research, advertising, obsolescence, trade-association maintenance, interest charges, all contingencies, necessary reserves, etc., such as are now assumed by the majority of the industry in the conduct of its business and is in accordance with this code of fair competition and with the objects of the act.

Section IV

The Element of Labor

The depressed condition of the industry has had the effect of greatly reducing employment and wage scales and has had a demoralizing effect on working conditions generally.

The persons, firms and corporations submitting this code subscribe to the view that the depression can be ended and prosperity restored only by remedying conditions of unemployment and restoring the buying power of the people by raising existing wage levels.

They have been prevented from remedying conditions in their own industry by the depressed prices which have deprived the business of all profit, rendered many concerns insolvent and forced others into bankruptcy.

Elevation of current prices to a figure equal to or above the fair average cost of selling lime products in particular marketing districts, with proper safeguards against unfair price-cutting within the industry or in competing or substitute industries, is therefore a condition precedent to any general wage increase or improvement in working conditions in the lime industry.

Conditioned upon improvements in the lime business which will make improvements in labor conditions economically possible, the lime industry, through the Trade Relations Committee, pledges itself to the observance of the following schedules of maximum working hours and minimum wages:

1. *Working Hours.*—The hours of labor in and about a lime plan shall be standardized for all lime plants in the United States at not to exceed 8 hr. in any one day and not to exceed a total of 48 hr. in any one week; provided, however, that because of seasonal business manufacturers may work labor in excess of these maximum hours above mentioned to meet seasonal requirements, but the total hours over a 6-month period shall not average more than the maximum working hours above fixed.

These maximum hours shall not apply to foreman, superintendents, managers, officials or others compensated on a regular salary basis.

2. *Rates of Wages.*—The minimum wage for labor in all districts shall be not less than 25 c. per hr. in all territory south of the northern boundary of Virginia, West Virginia, Kentucky and the southern boundary of Missouri and Kansas, including the manufacturing section known as Southwestern Missouri; in all other territory the minimum wage rate shall be not less than 35 c. per hr.

Section V

Sales Below Cost

In formulating this code the lime industry has sought to insure a price level which will protect the wage schedule and working conditions herein specified without undertaking the establishment of a fixed price level designed to yield the industry a specified profit, not because the industry does not believe that the latter procedure is preferable but because it is seeking to conform to the policies of the government as they have been revealed in unofficial pronouncements to date.

Therefore, while the lime industry is not pressing for the approval of a fair price agreement for the time being, it nevertheless is convinced that the public has not the right and does not desire to buy lime or lime products at less than the reasonable cost of producing and marketing the same, and this code is designed to insure to the industry the realization of cost in every transaction during the life of the code or until amended.

In assuming the obligations of the National Industrial Recovery Act the lime manufacturers ask only at this time that the government take cognizance of the demoralized condition of the industry and of the difficulties inherent in the computation and observance by individual concerns of their individual costs, and that it aid the manufacturers in enforcing as minimum selling prices for lime or lime products fair average costs, as defined in this code, computed in and for the several districts, which costs shall make due allowance for the increased wages and improved working conditions herein provided.

Under this plan it is proposed that the Trade Relations Committee shall receive the recommendations of the manufacturers in each district as to the fair average basing-point cost of goods sold in each district and as to the basing point or points for each district and to promulgate such fair average basing-point cost and basing points as to each such district for the guidance of the industry, provided, however, that in case of any conflict between districts or between individuals in different districts or between individuals within any district where a dispute has not been satisfactorily settled within the district then the Trade Relations Committee of the National Lime Assn. shall have the power to determine the question in dispute and its decision shall be final.

The minimum price to be charged and collected by all manufacturers for lime or lime products sold at any point in any such district shall be the basing-point cost for that district, as determined, plus basing rail freight. Any sale by any manufacturer at less than such minimum delivered price, shall constitute a sale below cost within the meaning of this code.

Minimum (cost) selling prices shall at all times be subject to the approval of the Administrator of the National Industrial Recovery Act or other duly authorized government agencies.

The word "districts" appearing in this code shall be construed as meaning the districts presently designated in the constitution and by-laws of the National Lime Assn., provided, however, that no change in districts shall be made without the approval of the district or districts affected by the change.

Section VI

Unfair Methods of Competition

1. *Departure from Agreed Working Conditions.*—The paying of lower wages for the various classes of employees than the minimum wages herein prescribed, or the exaction of hours of labor in excess of the maximum herein prescribed, shall be deemed an unfair method of competition; if wage scales above said minima and working hours below said maxima have been established in any district in accordance with the provisions of this code, then any reduction in said minimum wage and/or increase in said maximum hours in such district, shall be deemed an unfair method of competition.

2. *Selling Below Cost.*—The selling of lime or lime products below cost as defined in this code, except to meet an established delivered market price, shall be deemed an unfair method of competition.

3. *Standard Forms of Quotations and Contracts.*—All quotations shall be made in accordance with the terms and conditions set forth in the standard forms of quotations adopted by the respective districts, and all contracts shall be in accordance with the terms and conditions set forth in the standard forms of contract so adopted; provided, however, that in case of any conflict between districts or between individuals in different districts or between individuals within any district where a dispute has not been satisfactorily settled within the district then the Trade Relations Committee of the National Lime Assn. shall have the power to determine the question in dispute and its decision shall be final. Any departure from said standard terms and conditions in any transaction shall be deemed an unfair method of competition.

4. *Commercial Bribery.*—To give or permit to be given to the agents, employees or representatives of customers, or the agents, employees or representatives of competitors' customers or prospective customers, money or anything of value as inducement to cause their employers or principals to purchase or contract to purchase industry products, or to influence such employers or principals to refrain from dealing or contracting to deal with competitors shall be deemed an unfair method of competition.

5. *Rebates, Subsidies, Etc.*—To make allowances, such as bonuses, rebates, refunds, credits, unearned discounts, or subsidies of any kind, whether in the form of money, services, advertising, or otherwise, for the purpose of securing business shall be deemed an unfair method of competition.

6. *Lump-Sum Bidding.*—The practice of submitting bids for two or more commodities, one of which is lime or a lime product, in which the unit price of each commodity is not clearly stated shall be deemed an unfair method of competition.

7. *Combination Sales.*—To sell or offer to sell other commodities at prices below the current price list established by the manufacturer quoting for each commodity in order to influence the sale of lime or lime products shall be deemed an unfair method of competition.

8. *Inducing Breach of Contract.*—To wilfully interfere with any existing contract between any other manufacturer and a wholesaler, retailer, consumer, or other party, in-

volving or relating to the sale of industry products, such interference being for the purpose or with the effect of dissipating, destroying or appropriating, in whole or in part, the business represented by such contracts shall be deemed an unfair method of competition.

9. *Defamation of Competitors.*—To defame or disparage a competitor, directly or indirectly by words or acts which untruthfully call in question his business integrity, his ability to perform his contracts, his credit standing or the quality of his product shall be deemed an unfair method of competition.

10. *Use of Old Packages.*—The practice of shipping lime for resale purposes in the original containers packed at the point of manufacture is considered the best method of distribution. From the standpoint of quality, weights and identification of source of manufacture the interest of the public is thereby best protected. For a lime manufacturer to knowingly ship to an individual firm or corporation bulk lime for resale in containers, shall be deemed an unfair method of competition.

11. *Misrepresentation.*—To sell or offer for sale any industry product for the purpose of or with the effect of deceiving customers or prospective customers as to the quantity, quality, or grade of such product, shall be deemed an unfair method of competition.

12. *False Branding.*—Marking, branding and labeling products and making statements regarding products, the purpose or effect of which may be to mislead or deceive purchasers as to the quantity, quality, grade or substance of the goods purchased shall be deemed an unfair method of competition.

13. *Imitation of Trade Marks.*—To imitate or to simulate the trade-mark, trade name, package, brand or label of a competitor in such degree as to deceive, or have a tendency to deceive customers shall be deemed an unfair method of competition.

14. *Maintenance of Confidence and Stability.*—To put into effect changes in the established marketing customs and usages of the industry which tend to impair confidence or destroy stability in the industry without such reasonable notice as will enable the industry to meet such innovations on a basis of fair and open competition shall be deemed an unfair method of competition.

15. *Consigned Goods.*—The shipping of lime or lime products on consignment shall be deemed an unfair method of competition.

16. *Transactions with Jobbers, Distributors or Brokers.*—It shall be deemed an unfair method of competition for any manufacturer to create or enter into relations with any jobber, distributor or broker without imposing as a condition the requirement that such jobber, distributor, or broker shall subscribe to and agree to be bound by all the provisions of this code relating to the sale of the various types of lime; and manufacturers failing to impose such conditions in their relations with jobbers, distributors or brokers shall be responsible for all acts of such jobbers, distributors or brokers in violation of the provisions of this Code.

17. *Definition of Jobber, Distributor or Broker.*—A jobber, distributor or broker is hereby defined as any person, firm or corporation (not a retail dealer) who is engaged in selling lime or lime products, either exclusively or with other materials, to retailers and/or consumers with whom he is not connected or related in business.

18. *Published Prices and Terms.*—All prices, terms and conditions of sale shall be filed with the Trade Relations Committee by all manufacturers not less than 5 days in advance of the effective date and publishing thereof, and adhered to until new prices and/or terms and conditions are published and filed. Any deviation from a published and/or filed price list and terms and conditions of sale shall be deemed an unfair method of competition. The Trade Relations Committee shall promptly distribute copies of all such price lists to the members of the industry.

19. *Shipments Without Orders.*—The practice of making shipments, other than those involving mere transfers of material to the warehouses or plants of the shipper, without in each case having an order from the customer for the shipment at the time of making same shall be deemed an unfair method of competition.

20. *Protected Contracts.*—All *bona fide* contracts, and contracts/or orders for shipment for specific jobs taken before or after the effective date of this code, may be protected at the price at which the contract and/or order was taken and materials sold under such protection shall be applied only on the contract and/or order for which the protection was given and any shipment contrary to this provision shall be deemed an unfair method of competition.

21. *Contract Terms and Conditions.*—All quotations to expire 15 days from date unless specifically renewed except where otherwise necessary for government, state, county or municipal bidding requirements.

Chemical Lime

Contracts not to exceed three months to be accepted, expiring on the last day of March, June, September, and December.

Contract inquiries not to be quoted, or closed, before the first day of the last month of the preceding quarter.

Building Lime

In lieu of making specific job contracts with dealers and processors, a purchase order at the prevailing price will be considered as a sufficient, binding contract, with the provision that, if the price advances at any time, a specific job contract will be written for the amount of lime still required. Specific job contracts must be supported by the dealer's original order and record of prior deliveries and the contractor's written estimate of the balance required for completion. A suggested form of order is as follows:

To XYZ Lime Company
New York City

We have sold ———— contractor, ————, (address) for the construction of apartment house for the ———— Company of ————, (address) XYZ Lime for his full requirements on this project, estimated as approximately ———— tons.

We hereby place with you our order for XYZ Lime for this work, shipments to be made as the work requires.

It is understood that if you advance your current price you will, before the effective date of your new price, enter into your standard form of specific work contract with us at your price prior to the advance for such quantity of lime as may at that time be required for the completion of the work covered by this order. It is understood that in that event we will supply you, as the basis for such specific work contract, our record of lime delivered to the contractor prior to the time of your advance in price, together with a written estimate from the contractor of the amount of lime still required to complete the work.

Agricultural Lime Products

Quotations for the period January 1 to June 30 shall not be made prior to December 1, and for the period July 1 to December 31 shall not be made prior to June 1.

Commitments for deliveries shall be for the half-year period only, namely, January 1 to June 30, and July 1 to December 31.

Government, State, County, and Municipal Requirements

Shall not be quoted prior to 10 days before opening of bids, and are void unless award is made and contract executed with manufacturer within 30 days thereafter unless otherwise specified in inquiry.

Calendar quarterly contracts only to be accepted, unless otherwise specified in the proposal and specification.

Any deviation from rule 21 shall be deemed an unfair method of competition.

SECTION VII

Statutory Provisions

In keeping with the requirements of Sec. 7 (a) and 10 (b) of the National Industrial Recovery Act the lime industry subscribes to the following provisions:

Sec. 7 (a)

(1) That employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection;

(2) That no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and

(3) That all employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

Sec. 10 (b)

The President may from time to time cancel or modify any order, approval, license, rule, or regulation issued under the Act.

SECTION VIII

Administration and Enforcement

1. *Delegation of Authority.*—The industry recognizes that plant-operating policies, such as the determination of wages and working hours within the minimum and maximum herein specified, are of concern only to the manufacturers located in the several districts, and the formulation of such policies in each district is confided to the manufacturers located therein.

The industry also recognizes that, due to competitive conditions in the lime business, all marketing policies have effects and repercussions beyond the boundaries of any district and final jurisdiction over all marketing policies under the code is vested in the Trade Relations Committee. So far as possible, these matters shall be settled within the district, with the right of appeal to the Trade Relations Committee as herein provided.

2. The Trade Relations Committee shall have powers and duties as provided herein, and in addition such others as are prescribed in specific rules of the code.

(a) The Trade Relations Committee shall be empowered to enter into such agreements with the President as may be required by the President. If desirable, the Committee may delegate any of its authority to accredited representatives of not less than three to act in such matters.

(b) The Trade Relations Committee shall be empowered to appoint a confidential agency to collect from all lime manufacturers monthly records relative to hours of labor, wage rates, production, sales and such other statistics as it may deem necessary to properly plan for the future of the industry, and all such information shall be kept confidential.

(c) The Trade Relations Committee shall have the right at any time to employ a confidential agency to examine, without advance notice, all books of record of any manufacturer to determine that all agreements as to hours and rates of labor, as well as all other provisions established in this code, are being maintained, which information shall be kept confidential except when it is necessary to disclose it to establish a violation of this code.

(d) The Trade Relations Committee shall have the right to request the President to cancel or modify any order, license, rule or regulation issued under authority of the act, or to present any regulations governing the conduct of the industry which may, from time to time, seem wise and expedient; provided, however, that no changes or additions to this code shall be recommended to the President by the Trade Relations Committee unless and until the lime industry approves such changes or additions, by a majority of those voting, either at an industry conference or by letter ballot.

(e) The Trade Relations Committee shall have the right to establish its own rules for the conduct of all business of the committee.

2. *Coöperation with Enforcement Offices.*—The Trade Relations Committee shall coöperate with the prosecuting officers of the government to enforce compliance with the provisions of this code.

3. *Cost of Code Administration.*

(a) The cost of administration of this code shall be borne on a *pro-rata* tonnage basis by all lime manufacturers through the National Lime Assn., and shall be based upon the total tonnage of quicklime and hydrated lime manufactured and sold by the respective individuals, companies, partnerships, corporations or unit groups of manufacturers covered by this code during the immediately-preceding calendar year at a rate per ton to be determined by the Trade Relations Committee.

4. *Date of Effectiveness.*—All provisions of this code shall become effective and operative within 10 days after the code is approved by the President.

SECTION X

Submission of Code

It is the purpose and desire of the lime industry to comply fully with the provisions of the National Industrial Recovery Act.

The lime industry respectfully asks that this submission be received as a code of fair competition under Sec. 3 (a) of said act and as an Agreement under Sec. 4 (a).

Rezola Cement (from page 32)

tion chamber, which is quite small and round in section with a slight cone at the top and the bottom. The centrifugal effect causes the coal to remain in suspension the length of time necessary for perfect combustion. The secondary air is injected in part with the coal and in part through the base of the combustion chamber, also tangentially. A Borsig boiler with vertical tubes is used. It has an area of 2,475 sq.ft. and is built for 295-lb. pressure and 375-deg. C. superheat. It has a 495-sq.ft. economizer of the fin type capable of heating water from 40 to 130 deg. C. and producing 17,600 lb. of steam at 83-per cent. efficiency. A water-softening plant is provided for the feed water. Forced draft is obtained by an exhauster with a 30-hp. variable-speed motor.

Coal is fed to mills from a 75-ton storage-bunker. Each mill has its own belt-type feeder, the pulley of which is a magnetic separator. The speed of the belt and the height of the coal on the belt can be controlled at will.

There is a Siemens turbine, having a capacity of 1,280 to 1,600 kw. at 265 lb. and 350 deg. C. and rotating at 5,000 r.p.m. with a condenser for 19,200 lb. of steam per hr. This turbine is connected through a Krupp speed-reducer, 5,000 to 1,000 r.p.m., to a Siemens generator rated at 2,000 kv.-a., 3,150 v., and 50 cycles. The current is boosted by a transformer station to 20,800 v., this being the voltage of the transport line from the hydro-ëlectric plants, and is transmitted at this voltage to the cement plant.

Employee Relations.—A very interesting feature of this modern cement plant is the social aspect. The relations between the owner, M. Rezola, and the men are extremely cordial, M. Rezola taking a fatherly interest in every one of his men. The working conditions are very good, the plant is kept extremely clean, and all the machinery is excellently guarded to prevent accidents. The company has built a large club-house for the workmen and in it there is a large auditorium with a stage where free "movies" and lectures are given to the employees. A very fine restaurant and grill room is run in connection with the clubhouse.

Some of the men live in apartments built by the company but there are also a great number of small attractive concrete homes that the company rents to the foremen, and to some of the older workmen with families, at very reasonable rates. The houses have their own private yards and gardens and are built in a very beautiful setting. The community boasts of a church and a hand-ball court.

The superintendent of the plant is M. Julian Rezola and the engineer is M. Jose M. Rezola, sons of the owner, Ricardo Rezola. The main office of the company is at the plant and a sales office is maintained in San Sebastian.

The Changes That Occur During the Burning of Portland Cement

By WILLIAM N. LACEY

Gates Chemical Laboratory,
California Institute of Technology

THE importance of the burning of Portland-cement mix to produce clinker has encouraged much study of the nature of the chemical reactions involved. The complexity of the reactions of silicates at high temperatures, together with the difficulty of identification of the reaction products, has called for extended and careful research. As knowledge accumulates regarding the reactions and their products, interest increases as to the rates with which these reactions proceed under definite conditions.

One method of determining the rates of the kiln reactions makes use of laboratory studies under controlled temperature conditions. Another attack, which is perhaps closer to the heart of the mill man, is to follow the course of reaction as the mix proceeds through the operating commercial kiln. An attempt to develop the latter method has been made at the Crestmore, Cal., plant of the Riverside Cement Co. and the procedure used is here described.

Sampling.—The first problem encountered is that of taking samples from a series of locations along the length of the operating rotary cement kiln. For this purpose one of the 102-ft. dry-process kilns at Crestmore was equipped with specially-designed sample tubes, extending through the refractory lining and the outer steel shell. These heat-resisting alloy tubes, providing access to the interior of the kiln, were closed by a bayonet-lock cap when not in use. When a sample was to be taken at a given location, the cap was removed when the tube was in a horizontal position and traveling downward, a clean-out rod was run through the tube, and a sample-collecting inner tube was inserted and locked in place. As the tube passed through the low position it would fill with some of the kiln charge in the state existing at that point in the kiln. As the sampler came up to horizontal it was removed and the cap put back in place, the sample being emptied into a tight-topped can for storage. These sample tubes could be used at locations from the upper, or feed, end of the kiln forward to such a position that the rest of the samples could be taken through the lower, or discharge, end of the kiln. The various sampling locations are shown in Fig. 1. Samples 1 to 5 were taken by means of a sampling cup on the end of a long pipe, operated through the hood. Samples 6 to 12 were taken by the tubes set in the kiln walls. Kiln-feed samples were taken from the feed chute at the point of entrance to the kiln. It was found to be very important to use much care in the storage of these kiln-charge samples, due to their hygroscopic character. Consequently the samples were quickly ground, quartered and the portion to be used placed in a tightly-covered can which was placed in a larger similar can together with some of the rest of the sample to serve as a conditioning agent for the air in the outer can.

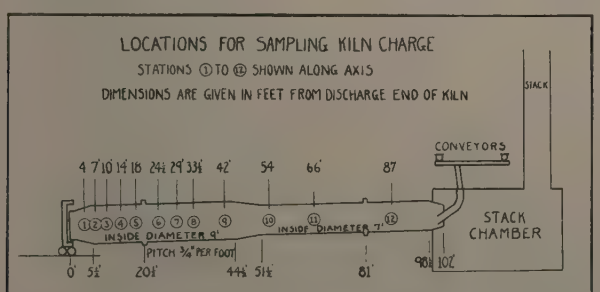

LOCATIONS FOR SAMPLING KILN CHARGE
STATIONS ① TO ⑫ SHOWN ALONG AXIS
DIMENSIONS ARE GIVEN IN FEET FROM DISCHARGE END OF KILN
STACK
CONVEYORS
4 7 10 14 18 24½ 29 33½ 42 54 66 87
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫
INSIDE DIAMETER 9'
INSIDE DIAMETER 7'
PITCH ¾" PER FOOT
STACK CHAMBER
0 5½ 20½ 44½ 51½ 81 98 102

Fig. 1. Diagram of kiln, showing points at which samples were taken.

In order to follow the progress of reactions in the kiln, a set of samples was taken once each hour, over a 5-hr. period of operation, 5 individual samples from any given location being composited to give one representative sample. This procedure would tend to minimize the effect of temporary changes in character of the charge at a given location due to surging.

Analysis.—The samples were analyzed to determine the loss on ignition, combined carbon dioxide, water, and free lime. A weighed portion of the finely-ground sample was placed in a boat in a tube furnace, heated to 1,000 deg. C., and the evolved carbon dioxide and water vapor swept over into weighed absorption tubes by means of a slow stream of purified air or nitrogen. The water vapor was absorbed by desicchlora (anhydrous barium perchlorate) while the carbon dioxide was absorbed by ascarite (asbestos impregnated with sodium hydroxide). The decrease in the weight of the sample gave the loss on ignition, while the increases in weight of the absorption tubes served to determine the combined-CO_2 content of the sample and the water content. Free lime was determined by a modification of the method proposed by Lerch and Bogue,[1] which consists of a titration with ammonium acetate in absolute alcohol solution, using phenolphthalein as indicator.

Illustrative Experimental Results.—Experimental results, illustrative of the use of this method of studying the progress of the kiln reactions, are shown in the accompanying figures. Fig. 2 presents graphically the analytical results from one

[1] *Industrial and Engineering Chemistry*, xviii, 739 (1926).

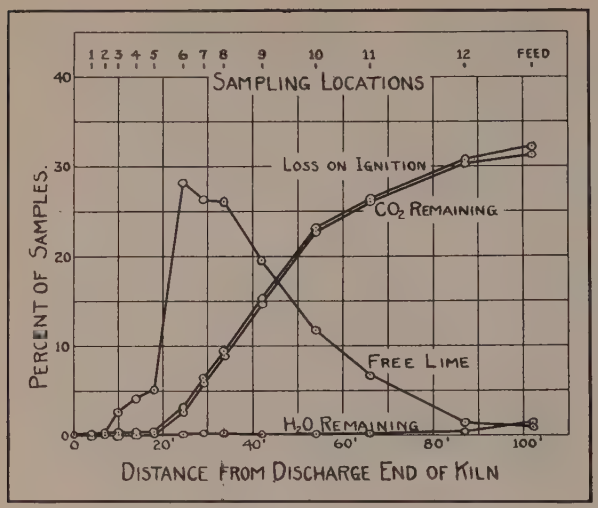


Fig. 2. Analytical results of one set of samples.

set of corresponding samples taken from the various stations of the kiln during a 5-hr. period. At the time of sampling the kiln was being fired with natural gas and the exit gases passed through a waste-heat-boiler system. The kiln feed consisted of a dried raw mix blended with a small amount of returned stack dust collected by electric precipitators. The percentages given in this figure are referred to the weight of each sample, as obtained, as 100 per cent. It is obvious that, since the weight of any one portion of original charge is continually changing as it progresses through the kiln, these figures are not directly comparable. They should be reduced to a common basis, corresponding, for example, to a given sample of original raw mix, in order that changes from station to station may be correctly appraised. This reduction to a common basis may be simply accomplished in the case of the data given in Fig. 2, provided that it is assumed that the "loss on ignition" gives a true measure of the total volatile matter remaining in the charge as sampled at a given location.

Since the cement manufacturer's interest is centered largely upon the state of combination of lime in the charge, the results in Fig. 2 have not only been brought to a common basis for comparison, but have been recalculated to indicate the state of combination of the CaO of the charge. This latter calculation involves the apparently-justifiable assumption that the $MgCO_3$ in the raw mix is quickly calcined, losing its CO_2 before appreciable amounts of the more stable $CaCO_3$ are decomposed. The results, thus recalculated, may be found in Fig. 3. The three curves shown indicate, for any location along the kiln, the proportions of the total CaO of the original raw mix which are present in the charge, respectively, as undecomposed $CaCO_3$, as free CaO, or as CaO combined with SiO_2, Al_2O_3, etc. Some of the lime in the last classification existed in such combination in the original raw mix as shown at the right-hand end of the curve, but all the increase above this original amount has resulted from reactions within the kiln, presumably by recombination of free CaO with the more acidic constituents of the charge, such as Fe_2O_2, Al_2O_3 and SiO_2.

Conclusions.—For the kiln and operating conditions here studied several facts are indicated by the data presented.

The small percentage of free and combined moisture in the raw mix was rapidly driven off near the upper end of the kiln.

Evolution of CO_2 from the carbonates of the charge became appreciable in the early stages of the passage of the charge through the kiln. Calcium carbonate was decomposing at locations in the kiln where the average temperature of the charge would be expected to be below that at which such decomposition would occur at an appreciable rate. This early decomposition probably resulted from local overheating of the surface particles of the charge before the absorbed heat could be distributed to the mass as a whole. Brightly-glowing particles visible near the upper end of this short dry-process kiln lend weight to this explanation.

Undecomposed calcium carbonate persisted in the charge to within 20 ft. of the lower end of the kiln, possibly due to protection resulting from the lumping of the charge higher in the kiln.

The production of free lime, beginning slowly at the upper end of the kiln, soon became rapid and a rather large percentage accumulated in the charge, in spite of the rapidly-increasing recombination reactions.

Although recombination of lime took place almost throughout the length of the kiln, at a position approximately 25 ft. from the lower end the reactions became very rapid, over 40 per cent. of the total lime of the charge reacting during a travel of 5-ft. along the kiln. The last of the free lime recombined much more slowly, possibly due to its decreasing contact in the clinker with materials with which it might react, and to a decrease in

(Continued on page 40)

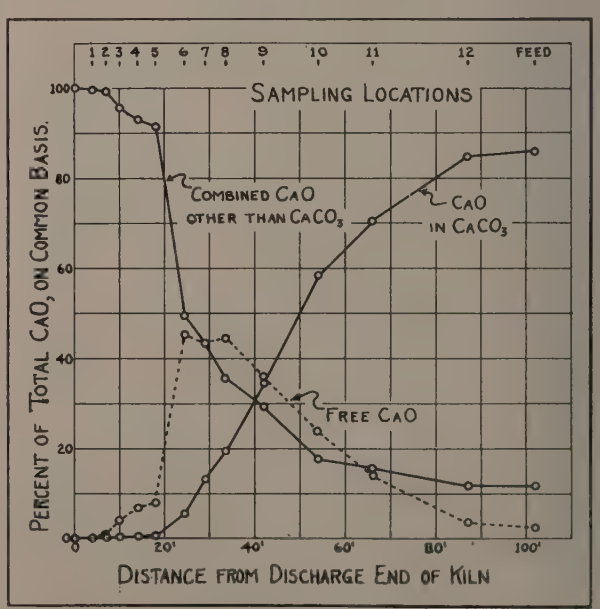


Fig. 3. Results recalculated to show combination of CaO.

Thirteenth Lime Meeting Draws Biggest Attendance in Last Three Years

Growing Use of Building Lime and Dry-Ice Opportunitities Discussed

DEFERRING to the more urgent need of the lime industry the National Lime Assn. cut short its fifteenth annual convention at the Haddon Hall Hotel at Atlantic City, New Jersey, scheduled for June 28 and 29. Officers and members devoted all their time, with the exception of one session, to the work of drawing up a code of fair competition for the entire industry under the provisions of the National Industrial Recovery Act. The conference of the entire lime industry was planned to preceed the association meeting, but as its work was not completed the association postponed its meeting until June 29.

Attendance was larger than at any time in the past three years and all members felt that the industry had reached a definite turning point after the conditions which have affected the lime industry and other industries during the depression. Attending also were several non-members of the association who had met in the lime industry conference and remained for the association convention at the invitation of the members.

The meeting opened with Bernard L. McNulty, chairman of the board of directors, presiding. As first speaker, Norman G. Hough, president and general manager of the association, with the subject *Forging Ahead,* described the progress of the lime industry in the past five years. As an example of the association's work in developing markets and in promoting the use of lime, Mr. Hough presented figures on the use of lime in building construction. He declared that in 1932 more than twice as much lime was used per square foot of floor space erected in the United States as was used in 1928. Although the total amount of constructed floor space was much lower in 1932 than in 1928 and the total amount of lime sold was smaller, the use of lime has doubled in proportion, and with an increasing volume of construction the lime industry can expect to continue to better its markets.

Mr. Hough cited this instance of the association's importance to the industry as demonstrative of what can be expected from similar work. He attributed the gain largely to the efforts of the association. From lack of time, owing to the short session of the convention, he was unable to go further into detail in his remarks and was forced to eliminate much of the material which was prepared.

Dr. Edward P. Gillette, of the Gillette Research Corp. of Toledo, O., presented a paper on *Dry Ice in Its Relation to the Lime Industry.* According to Dr. Gillette, the lime industry is faced with a great opportunity in its ability to produce dry ice, as solidified carbon dioxide has come to be known.

"The lime industry can produce dry ice more cheaply than anyone else," declared Dr. Gillette. By the use of cleaner stone and by the proper separation of fuel gases the industry can, at slight cost, turn a waste product into a highly profitable by-product, which may in time become more important to the producer than his present major product.

The present centralization of the dry-ice industry is wrong, Dr. Gillette believes. He feels that the product should be and will be distributed to almost the same extent as water-ice and other refrigerants are distributed at present. He suggested that, with the present distribution of the lime industry over the entire United States, producers of lime are ideally located to assume the production and sale of this rapidly growing product.

Dr. Gillette discussed in detail the present sources of dry ice and compared them with the advantages held by the lime industry. Many other industries produce carbon dioxide as a by-product, but none have the opportunity to produce as pure a product at as low a cost which the lime producers have. In fact, according to the speaker, if the lime producers do not enter the dry-ice field, other interests will establish lime plants with the major objective of producing dry ice and will be able to put their lime on the market as a by-product at destructive prices.

Following his formal talk, the convention was thrown open for discussion and Dr. Gillette invited questions from the floor. The interest of the producers in the subject was evidenced by the numerous angles brought out in such questions. Questions regarding marketing, existing patents, containers for transportation, and equipment for reducing the gas to solid form brought much detailed information to the discussion.

Dr. Gillette has prepared a treatise on the various phases of the problems of producing and marketing dry ice which he offered to make available to members of the association.

Consideration of the Amendment to the Standard Lime Barrel Act and the Standardization of Lime Containers, which had been placed on the program of the convention, was tabled for lack of time. This subject will come up at a later meeting of the association.

Our Opportunity in the Field of Interior Plastering was the subject of an address by John C. Best, president of Best Brothers Keene's Cement Co., of Medicine Lodge, Kan. Mr. Best has been marketing Keene's cement for use in gaging lime plaster for many years and spoke at length on the subject of coöperation with lime producers in marketing and on the details of selling plastering materials.

The advantages of lime-mortar plastering were described briefly and among them its long life.

Citing as examples the lime-mortar plastering in the national capitol at Washington and in Independence Hall in Philadelphia, he declared that there is little question as to the permanence of this material. Even the paintings of Michelangelo and Da Vinci are on a lime-mortar base, he declared.

Mr. Best presented an impartial list of the advantages and disadvantages of lime-mortar plaster as viewed by the construction industry and discussed the problems which arise in selling lime plaster in competition with other materials. He listed the various factors in marketing plastering materials in the order of their importance in his experience. He placed the plastering contractor first in this list as the individual whose choice of materials to be used on any job is the most important. Others who must be "sold" are, in the order of their importance: the architect, the dealer, the general contractor, and the owner.

Following Mr. Best, Lee S. Trainor, chief engineer of the Construction Division of the association, spoke on the same subject. He presented many tables showing the relative costs of various types of plastering materials delivered to the job. Copies of his tables and the rest of his paper will be mailed to all members of the association.

Several amendments to the constitution and by-laws of the association were presented and adopted. These included chiefly changes necessary to conform to the provisions of the recovery act.

The annual budget of the association was read and approved. A tentative budget, for the operation of the code of fair competition under the National Industrial Recovery Act when approved, was presented for the information of the members.

Election of directors for the fiscal year of 1933-34 was not completed. Directors are chosen by their respective districts. The officers elected for the fiscal year are:

Bernard L. McNulty, temporary chairman, Board of Directors; Norman G. Hough, president and general manager; W. V. Brumbaugh, secretary and assistant treasurer; R. P. Wilton, treasurer.

The following members were elected to the executive committee by the Board of Directors:

Bernard L. McNulty, temporary chairman; J. M. Gager; J. M. Deely; Reed C. Bye.

Cement Burning (from page 38)

charge temperature at the lower end of the kiln.

Acknowledgment.—Credit for these results is largely due to Hubert Woods, Director of Research for the Riverside Cement Co., Los Angeles, and to Howard E. Shirley, at the time a graduate student at California Institute of Technology. Thanks are due to John Treanor, president of the Riverside Cement Co. for his enthusiastic support.

The following articles may be cited in addition to the one already named:

Lacey and Woods, *Industrial and Engineering Chemistry,* xxi, 1124 (1929).

Lacey and Shirley, *Ibid.,* xxiv, 332 (1932).

Steinour and Woods, *Rock Products,* xxxii, 74 (1929).

The American Lime Industry and the "New Deal"

By NORMAN G. HOUGH

President and General Manager
National Lime Association

THE progressive element of the lime industry approaches the "new deal" under the National Industrial Recovery Act with the firm conviction that improved marketing conditions will be established and maintained as a result of the adoption and approval of a code of fair competition.

The Trade-Relations Committee of the National Lime Assn. has given freely of its time and effort in the preparation of a tentative code of fair competition which was submitted to the industry at a conference scheduled for June 28, 1933, in Atlantic City, N. J. The National Lime Assn. is prepared to maintain its place of leadership in the industry and recognizes the increased responsibilities and opportunities for usefulness which become effective upon approval of a code of fair competition in the lime industry by the President of the United States.

These extended opportunities for helpful service include the consumer of lime and lime products, as well as the producer and his organization, since it is provided in the act that the trade association shall function for and on behalf of the industry it represents in all relations between the industry and the government, in addition to the usual promotional and educational contacts with the general public.

Recognizing its responsibility to the industry and the public, the National Lime Assn. is giving careful consideration to such reorganization as may be necessary to function effectively and efficiently on behalf of the industry under the terms of the recovery act. Appropriate steps will be taken to provide against unfair trade practices and to promote increased employment at fair and reasonable rates of pay. Precaution will be taken to guard against monopoly and the oppression of small enterprise. Fair, open competition will be maintained within the industry at commodity prices fair to the consumer. Every lime producer in the United States is urged to avail himself of the benefits accruing through well-directed coöperative effort and to show his good faith and genuine interest in advancing the causes of the industry by becoming a member of the National Lime Assn.

The second or public-works portion of the recovery act provides substantial early markets for lime and lime products, since lime is an essential ingredient in practically all masonry construction. Lime also finds a market of major proportions in plaster, stucco and similar uses.

The general increase in business which is expected to come as a result of operation under the recovery act should offer an increased market for lime in the industrial and chemical fields where it is extensively used as a process material.

A Practical Heat Balance for Studying Problems of Cement Kilns

By A. W. ROBINSON

DURING recent years considerable study has been made of the subject of cement-kiln heat balances. A great deal of careful laboratory experimental work has been done to determine the heat absorbed or given up in the various reactions in the kiln, and formulæ have been developed to determine and explain the heat losses to which the rotary kiln is subjected. Several very careful treatises that have been written go into every known detail of the problem and present as complete a picture of the theoretical cement-kiln heat balance as can be given with present-day knowledge.

However, the practical cement-mill operator, in attempting to apply this theoretical heat balance to his own particular kiln, is at once confronted with numerous difficulties. Just what values should be assumed for the heat given up or absorbed in the various reactions? Several equally-reliable but varying determinations have been made, the variation probably due either to difference in the material or the method of determination, and all or any of them may be inaccurate for the particular raw material under consideration. How are absolutely accurate average readings—of gas and air temperatures, exit-gas and fuel analyses, slurry moisture and temperature, fuel burned and slurry fed—to be obtained without prohibitive expense for instruments and labor? How, if and when the above are satisfactorily taken care of and an exact heat balance is worked out, is it to be put to practical use, and information of value to the mill operator derived? It is so complicated that a theoretically-correct heat balance is almost impossible to obtain for an actual operating kiln, and the chances of obtaining practical information from it may seem hardly worth the study and work necessary to "dig out" the heat balance. Consequently, except in a few cases, the heat-balance idea has rather been side-tracked as too theoretical for really-practical purposes.

Granting, however, that the inaccuracy and expense of data taking and the difficulty of determining the heat required for the various chemical reactions make an *exact* heat balance out of the question for a practical kiln installation, yet, with a few reasonable assumptions and a proper application of the heat-balance idea, very valuable information *can* be worked out at negligible expense for any cement mill with reasonably-accurate plant data.

Some five years ago a set of heat-balance calculations was worked out for use in predicting the results obtainable with slurry filters. This has been thoroughly tried out and proved in some fifteen to twenty actual installations. The cement industry is reasonably familiar with this as applied to slurry filtration alone, and it is entirely reasonable that a similar series of calculations should be as readily applied to the study of other kiln conditions, such as the reduction of exit temperatures by adding chains or lengthening the kilns, heating the combustion air with efficient coolers, changes in the slurry moisture and temperature, excess air, or the percentages of primary and secondary air, and similar items. Reasonably-correct information is so readily available with little work or expense that the general principles and typical examples should be well worth the thought and study of practical operating men in the industry.

The purpose of this article is to show how the heat-balance theory can be put to practical use in determining the results to be expected on an operating kiln from changing certain of the conditions under which it is operating. It is to be considered in no way as an exposition of what is or is not good kiln practice, the example chosen being simply a fairly average one. Neither is it a treatise on the reactions taking place in the kiln and the heat absorbed or given up in them, these being taken directly from the work of others. It is not even an explanation of the calculations required to work out the heat balances. It is presented simply to illustrate how a comparison of heat balances, worked out from available plant data, will open a source of information on actual kiln operation which is well worth having.

Principles.—The basic idea involved in this heat-balance comparison is that, instead of attempting to work out an *exact* heat balance, we calculate an approximate one for the kiln under consideration, using reasonably-accurate assumptions of the heat absorbed or given off during reactions and taking for air, gas and slurry temperatures, fuel and raw material analyses, etc. simply the average readings as normally carried on plant records. Then, to determine the effect to be expected from the changing of one particular feature of the kiln operation, a second heat balance is calculated, using the same assumed values as in the first, and changing only the data affected by the change in kiln operation. These heat balances, considered alone, are of course not necessarily accurate. For comparative purposes, however, they are accurate enough to predict results obtainable to a remarkably-close degree. The theoretical assumptions are exactly the same in both heat balances and the errors due to them and to inaccuracies in the plant data counteract each other and leave the items being compared in correct relation to each other.

As stated above, this method has been used and proved accurate in many slurry-filter installations,

where actual results have varied from the predicted results by less than 3 per cent. in every case, and its use for other studies, involving nothing radically different, should be just as accurate. A typical example, worked out for a series of varied conditions will assist greatly in explaining how the comparative heat balances can be applied, and what information can be obtained by means of them.

Example.—Inasmuch as the original calculations were worked out for slurry-filter installations, let us take as our example a wet-process plant, although there is no reason why it should not be worked out for a dry-process plant as well. Let our hypothetical plant have reasonably average conditions, with a 10-ft. by 240-ft. kiln, without filters, chains, waste-heat boilers, or draft fans, with an ordinary rotary cooler, natural draft, and the kiln fed by a Ferris-wheel feeder. Our raw material will be limestone and clay, with 620 lb. of dry raw material per bbl. The kiln speed will be 75 sec. per rev., there are no special dust-collectors, and the slurry fineness is approximately 90 per cent. through a 200-mesh screen. Our slurry moisture is 30 per cent., the average daily output is 1,500 bbl., and the fuel rate 120 lb. of 13,000-B.t.u. coal per bbl. The assumed average readings of data taken at the plant, from which heat-balance calculations are made, follows:—

(*a*)	Dry raw material.....*lb. per bbl.*	620
(*b*)	CO_2 in dry solids.....*per cent.*	33.00
	Ultimate coal analysis, "as fired":	
(*c*)	C .....*per cent.*	70.00
(*d*)	H .....*per cent.*	4.95
(*e*)	O .....*per cent.*	7.84
(*f*)	N .....*per cent.*	1.44
(*g*)	S .....*per cent.*	3.34
(*h*)	Ash .....*per cent.*	11.63
(*i*)	Moisture .....*per cent.*	.80
(*j*)	Heat value of coal, "as fired"....*B.t.u. per lb.*	13,000
	Raw-material analysis:	
(*k*)	$MgCO_3$ .....*per cent.*	2.80
(*l*)	$CaCO_3$ .....*per cent.*	78.00
(*m*)	Miscellaneous ..*per cent.*	19.20
(*n*)	Primary air .....*per cent.*	40
(*o*)	Secondary air (from cooler).....*per cent.*	60
(*p*)	Temperature, raw materials.....*deg. F.*	90
(*q*)	Temperature, primary air.....*deg. F.*	90
(*r*)	Temperature, secondary air.....*deg. F.*	500
(*s*)	Temperature, exit gases.....*deg. F.*	1,000
(*t*)	Temperature, clinker leaving kiln....*deg. F.*	2,000
(*u*)	Excess air .....*per cent.*	10
(*v*)	Production .....*bbl. per day*	1,500
(*w*)	Moisture in slurry.....*per cent.*	36
(*x*)	Coal consumption, "as fired".....*lb. per bbl.*	120

Similar examples could of course be taken with waste-heat boilers, filters, chains, etc., or dry-process plants, but the example picked has more possibilities which can be investigated by means of the comparative heat balances.

Base Heat Balance.—From the above data a heat balance is first calculated for "existing conditions." The writer worked out a series of formulæ, into which the data can simply be inserted, and the results calculated rapidly and with an accuracy as good as is warranted by the data upon which it is based, column *A* of the accompanying table giving these figures. Items 8 to 26 can be calculated from these formulæ, and item 27 can be taken as the difference between "total heat in" (12) and "total heat out" (28). Thus, any errors, due either to faulty heat values or data, are simply lumped in this item 27. Detailed calculations are omitted on account of the lack of space, but could be supplied later if there is enough interest in them. Items 1 to 7 inclusive correspond to the items lettered *v*, *w*, *s*, *u*, *o*, *r* and *x*, respectively in the foregoing list.

From the recapitulation at the bottom of the table it will be noted that only 22.9 per cent. (item 35) of the total "heat in" is utilized in the reduction of the raw materials, whereas 30.05 per cent. (item 36) is required for the evaporation of the water in the kiln feed, 25.8 per cent. (item 37) is lost to the stack, 10.45 per cent. (item 38) goes out with the clinker (partly recovered in preheating the secondary air), and 10.8 per cent. (item 39) is left for radiation and the accumulation of errors in the data or assumptions. These figures check very closely with many actual plants on which the writer has calculated heat balances, and are hence right in line with actual practice.

Thus it is evident that there is plenty of room for improvement in the fuel rate, the 30 per cent. required for evaporation and the 25 per cent. lost to the stack being, of course, the most susceptible of elimination.

Reduction of Kiln-Feed Moisture.—As our first investigation let us consider slurry filtration, as the method of calculation was originally worked out for this and proved quite dependable. Furthermore, in this case at least, the evaporation of the water requires the greatest part of the total heat. We will assume that filtration tests indicate that slurry filters will reduce the kiln-feed moisture from 36 per cent. to 19 per cent. (which is in line with common practice). This means a reduction in water content from 349 lb. per bbl. to 145 lb. per bbl. All the other kiln conditions remain the same, except the fuel rate and, in one method of figuring, the kiln output.

There are two distinct methods of calculation which will bear discussion and comparison. Assume that our kiln under the original conditions (*A*) burns at its best thermal efficiency (lowest fuel rate) at a capacity of 1,500 bbl. per day. It will then, under the changed conditions (other than raw-material and fuel changes) still operate at its best thermal efficiency, when burning the same total coal per day as before, *i. e.*, 1,500 $\times$ 120 or 180,000 lb. per day. Our first method of calculation (column B_1 of the table), therefore, contemplates burning the same total amount of coal per day, and using consequently the same amount of air, so that all the heat-balance items involving fuel and air (items 8, 10, 11, 17 to 22, 24) will remain the same as in the heat balance *A*. As the fuel, air, and exit temperature remain the same, the radiation losses can for all practical purposes be considered as the same. All other items can be expressed in terms of the raw material burned, items 15 and 16 being reduced from the figures in *A* in the same relation as the change in the water content of the kiln feed (145/349). Equating the "heat in" to the "heat out", the amount of raw material burnable at best

efficiency can be quite readily calculated. When this is determined, the fuel-rate and the heat-balance items differing from *A* can be figured, and the heat balance completed.

This heat balance is shown below in column B_1, the comparison then showing a reduction in fuel rate from 120 lb. per bbl. to 86.7 lb. per bbl., and an increase in output from 1,500 bbl. per day to 2,080 bbl. A comparison of the recapitulations shows a reduction in the heat required for evaporation from 30.05 per cent. to 17.05 per cent. and an increase in useful heat from 22.9 per cent. to 31.3 per cent., the increase in heat lost with the clinker being, of course, due to the increase in output.

The second method of calculation is not quite as accurate as the first, but is perhaps more important at this particular time, because of the fact that the cement industry is not generally interested in increasing present kiln outputs and would probably prefer investigation based upon constant output. With this second method (Column B_2) the kiln output is kept constant, so that the raw-material item (9, 13, 14, 23, 25, 26) remain the same as in *A*. The radiation losses theoretically should be somewhat different, due to the reduction in fuel. However, the total radiation losses being only 10 per cent. of the total "heat in," the assumption of the same radiation losses as in *A* will introduce so little error that it can be neglected for our purposes. Items 15 and 16 can be calculated by multiplying the same items in *A* by the water ratio. All other items can be expressed in terms of the fuel burned, "heat in" equated to "heat out," the fuel rate determined, and the heat balance completed.

A comparison of B_1 and B_2 shows the reduction in fuel rate not as great in B_2 as in B_1, but it is still a very substantial one.

Both these methods of calculation have been tried and definitely proved as reliable in the many filter installations now in operation, which is our basis for believing them equally reliable for the other investigations described below.

Reduction of Exit-Gas Temperatures.—The heat losses out the stack being the second largest heat loss in our hypothetical plant, let us now turn to means of reducing them. Chains, baffles, lifters, draft fans, and increased kiln length are all means of doing this, and the results obtainable can be quite readily calculated if it can be determined what the final exit-gas temperature will become by means of our comparison of heat balances.

Column C_1, calculated by the first method described above, contemplates the reduction in exit-gas temperature, by some means, from 1,000 deg. F.

COMPARATIVE CEMENT-KILN HEAT BALANCES

ITEM	Base Heat Balance	Total Coal Burned Kept Constant					Kiln Output Kept Constant						
	A	B_1	C_1	D_1	E_1	F_1	B_2	C_2	D_2	E_2	F_2	G_2	H_2
(1) Kiln output...*bbl. per day*	1,500	2,080	1,750	2,015	1,613	2,870	1,500	1,500	1,500	1,500	1,500	1,500	1,500
(2) Kiln-feed moisture...*per cent.*	36	**19**	36	36	36	**19**	**19**	36	36	36	**19**	36	**38**
(3) Exit-gas temperature...*deg. F.*	1,000	1,000	**750**	**500**	1,000	**500**	1,000	**750**	**500**	1,000	**500**	1,000	1,000
(4) Excess air...*per cent.*	10	10	10	10	10	10	10	10	10	10	10	10	10
(5) Secondary air...*per cent.*	60	60	60	60	60	60	60	60	60	60	60	**80**	60
(6) Secondary-air temperature...*deg. F.*	500	500	500	500	**1,000**	**1,000**	500	500	500	**1,000**	**1,000**	500	500
(7) Fuel rate...*lb. per bbl.*	120.0	86.7	103	89.5	111.5	62.9	91.5	105.3	93.4	111.5	68.75	118.1	124.2
	(*B.t.u. per 120 lb. coal burned*)						(*B.t.u. per bbl. of clinker*)						
Heat In:													
(8) Heat from fuel	1,560,000	1,560,000	1,560,000	1,560,000	1,560,000	1,560,000	1,189,500	1,368,900	1,212,500	1,449,500	894,000	1,535,400	1,614,600
(9) Formation of clinker	59,400	82,300	69,300	79,700	64,000	113,400	59,400	59,400	59,400	59,400	59,400	59,400	59,400
(10) Heat from secondary air—O_2	15,600	15,600	15,600	15,600	32,900	32,900	11,890	13,690	12,100	32,900	20,250	19,300	16,140
(11) Heat from secondary air—N_2	59,400	59,400	59,400	50,400	125,500	125,500	45,250	52,050	46,140	125,500	77,300	73,560	61,400
(12) Total heat in	1,694,450	1,717,300	1,704,300	1,714,700	1,782,400	1,831,800	1,306,040	1,494,040	1,330,140	1,667,300	1,050,950	1,687,660	1,751,540
Heat Out:													
(13) $CaCO_3$ to CaO and CO_2	377,000	522,100	439,200	506,500	406,500	720,600	377,000	377,000	377,000	377,000	377,000	377,000	377,000
(14) $MgCO_3$ to MgO and CO_2	10,730	14,850	12,500	14,400	11,550	20,500	10,730	10,730	10,730	10,730	10,730	10,730	10,730
(15) Kiln-feed moisture—latent	340,000	195,000	396,200	456,500	366,500	269,200	141,000	340,000	340,000	340,000	141,000	340,000	369,000
(16) Kiln-feed—sensible and super	169,600	97,700	137,000	92,800	182,700	54,800	70,500	117,400	69,200	169,600	28,700	169,600	184,200
(17) CO_2 from fuel	71,750	71,750	48,800	28,550	71,750	28,550	54,700	42,950	22,200	66,650	16,300	70,500	74,500
(18) H_2O fuel—latent	52,900	52,900	52,900	52,900	52,900	52,900	40,260	46,400	41,100	49,050	30,200	51,900	54,700
(19) H_2O fuel—sensible and super	26,400	26,400	18,260	10,740	26,400	18,260	20,130	16,050	8,380	24,540	6,170	25,950	27,350
(20) SO_2 fuel	1,400	1,400	940	530	1,400	530	1,060	820	410	1,300	300	1,360	1,450
(21) N_2 fuel	400	400	290	180	400	180	370	250	140	370	100	390	410
(22) Ash out stack	1,590	1,590	1,150	720	1,590	1,590	1,210	1,010	560	1,480	410	1,550	1,650
(23) Dust from raw mix	10,460	14,460	8,840	6,330	11,260	9,020	10,460	7,580	4,720	10,460	4,720	10,460	10,460
(24) N_2 from total air	225,000	225,000	161,300	98,900	225,000	98,900	171,400	141,780	77,100	208,900	56,720	221,000	232,870
(25) CO_2 from raw mix	47,500	65,800	37,700	25,300	51,150	36,020	47,500	32,350	18,880	47,500	18,880	47,500	47,500
(26) Heat loss with clinker	177,000	245,200	206,470	237,600	190,550	338,000	177,000	177,000	177,000	177,000	177,000	177,000	177,000
(27) Radiation losses, etc	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720
(28) Total heat out	1,694,450	1,717,300	1,704,300	1,714,700	1,782,400	1,831,800	1,306,040	1,494,040	1,330,140	1,667,300	1,050,950	1,687,660	1,751,540
Recapitulation:													
(29) Heat to reduce raw mat..*B.t.u.*	387,730	536,950	451,700	520,900	418,050	741,100	387,730	387,730	387,730	387,730	387,730	387,730	387,730
(30) to evaporate water..*B.t.u.*	509,600	292,700	533,200	549,300	549,200	324,000	211,500	457,400	409,200	509,600	169,700	509,600	553,200
(31) lost out stack...*B.t.u.*	437,400	459,730	330,210	224,180	441,880	245,980	347,090	289,190	173,400	410,250	133,800	430,610	450,890
(32) lost with clinker...*B.t.u.*	177,000	245,200	206,470	237,600	190,550	338,000	177,000	177,000	177,000	177,000	177,000	177,000	177,000
(33) lost by radiation, etc.*B.t.u.*	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720	182,720
(34) Totals	1,694,450	1,717,300	1,704,300	1,714,700	1,782,400	1,831,800	1,306,040	1,494,040	1,330,140	1,667,300	1,050,950	1,687,660	1,751,540
(35) Heat to reduce raw material...*per cent.*	22.90	31.30	26.50	30.30	23.45	40.45	29.70	25.95	29.15	23.30	36.90	23.00	22.15
(36) to evaporate water *per cent.*	30.05	17.05	31.30	32.10	30.80	17.70	16.20	30.60	30.75	30.60	16.13	30.20	31.60
(37) lost out stack...*per cent*	25.80	26.75	19.40	13.10	24.80	13.43	26.55	19.35	13.05	24.55	12.73	25.50	25.75
(38) lost with clinker...*per cent.*	10.45	14.25	12.10	13.85	10.70	18.45	13.55	11.85	13.30	10.60	16.84	10.50	10.10
(39) lost by radiation, etc...*per cent.*	10.80	10.65	10.70	10.65	10.25	9.97	14.00	12.25	13.75	10.95	17.40	10.80	10.40
(40) Totals...*per cent.*	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

to 750 deg. F. The fuel and air remaining the same, items 8, 10, 11, and 18 remain as in *A*. The radiation losses should theoretically be reduced slightly, due to the lowered exit temperature, but inasmuch as most of the radiation takes place from the hot zone of the kiln and temperatures there remain the same, the assumption of the same radiation losses introduces only a negligible error. All other items can be expressed in terms of the raw materials burned, taking into account the lowered heat losses due to the lowered exit temperature. Equating "heat in" to "heat out", the expected output and fuel rate can be calculated and the heat balance completed. This shows a reduction in the losses from the stack from 25.8 per cent. to 19.4 per cent., and a reduction of the fuel rate to 103 lb. per bbl.

Column C_2 is calculated by the second method and should need no detailed explanation, the fuel rate resulting being somewhat higher than C_1, just as it was in the case of the reduction of the kiln-feed moisture.

Columns D_1 and D_2 are based upon a reduction in the exit temperature to 500 deg. F., which can perhaps be accomplished by lengthening the kilns, installing chains or lifters and draft fans. As the calculations are made in the same manner as in C_1 and C_2, no additional explanation is necessary here.

Preheating the Combustion Air.—The importance of preheating the combustion air can be quite readily investigated by means of the heat balances. Let us assume that a cooler, which will raise the temperature of the secondary air from the original 500 deg. F. to 1,000 deg. F. can be installed, all the other data, except the fuel rate and the kiln output, remaining the same as in *A*.

By the first method (column E_1) the fuel items (8, 17 to 22, and 24) remain the same. Again assume the radiation losses to be the same, though theoretically not exactly correct. Secondary-air items 10 and 11 are readily calculated for the higher secondary-air temperature. All the other items can be expressed in terms of the raw material burned, "heat in" equated to "heat out," and kiln output and fuel rate computed. The results indicate a saving of 8.5 lb. of coal per bbl. by increasing the secondary-air temperature from 500 deg. F. to 1,000 deg. F.

The second method is shown in column E_2, and needs no explanation, after working through the previous heat balances.

Combination of B, D, and E.—The question often arises as to how low a fuel rate could be obtained by combining filters, long kilns, chains, draft fans, and efficient coolers, and this can be determined for our hypothetical kiln by combining *B*, *D*, and *E* to obtain a new heat balance, *F*.

By the first method (F_1) only items 8, 18 and 27 remain the same as in *A*, the rest being modified for higher secondary-air temperature, lower exit-gas temperature, and lower kiln-feed moisture, the results indicating a fuel rate of 62.9 lb. per bbl. with an output of 2,870 bbl. per day.

By the second method (F_2), holding the kiln output at 1,500 bbl. per day, the fuel rate naturally is higher, due to the greater radiation losses per bbl.

Changes in Proportion of Secondary Air.—The effect of changing the proportions of secondary and primary air can likewise be investigated by our heat balances. Assume, for example, that it is possible to increase the secondary air from 60 per cent. to 80 per cent., maintaining the same temperatures as in *A*.

This heat balance, G_2, is calculated only by the second method, as the results by either method will be almost the same and, due to the similarity to previous heat balances, no comment is necessary, except to note that a saving of approximately 2 lb. of coal per bbl. is indicated.

Increases in Slurry Moisture.—Suppose, by experiment in our original plant, we discover that, by increasing the slurry moisture to 38 per cent., better results can be obtained in the raw mills, either in power consumption, output, or fineness, and we wish to know what effect this will have on the fuel rate. Our heat balance will tell it readily enough, column H_2, figured by the second method, showing an increase of 4.2 lb. per bbl.

Further Possible Investigations.—Other applications of the comparative heat balances can be used to study other features of kiln operation, such as changes in the fuel analysis, excess air, slurry temperature (seasonal or intentional), primary-air temperature, etc., all which should be extremely enlightening to the operator interested in all the phases of his kiln operation. The examples previously given, however, illustrate the methods of doing this, and further hypothetical examples are hardly worth while in a brief article.

Conclusions.—The heat balances covered in this article indicate what might be done to improve the fuel rate on one particular hypothetical kiln by changing certain of the operating conditions. Just how these changes can be accomplished and what they will cost are, of course, another problem, and whether all or any of them would be worth while can only be determined by the cost.

It should be borne in mind that the results indicated for this one plant are applicable to it *only*, and these heat balances should not be accepted as criteria for other plants, even though they appear to have quite similar conditions. Differences in fuel, raw material, exit temperatures and other items may make a great difference in the results obtained, and each plant considered should have the heat balances carefully worked out for it alone.

While this example has been carried through for a wet-process 240-ft. kiln without waste-heat boilers and with limestone-clay as raw material and coal as fuel, the heat balances can be as readily applied to the dry process, any length kiln with or without waste-heat boilers, any raw material and oil or gas as fuel, although with oil or gas, separate formulæ must be used.

In any case the use of this method of studying burning conditions should influence plant operation quite markedly, and might lead to a general reduction of fuel rates throughout the cement industry.

How the $400,000,000 Federal Highway Appropriation Will Be Spent

ACTING Secretary of Agriculture R. G. Tugwell, with the approval of Harold L. Ickes, chairman of the Special Board for Public Works, has issued rules and regulations for carrying out the provisions of Title II (the public-works division) of the National Industrial Recovery Act. These were approved June 23. The allotments given the various states under the act's appropriation of $400,000,000 are listed on page 15 of this issue.

The rules prescribe how the money made available shall be expended, the kinds of labor that may be employed, the hours of labor, and other conditions that are of importance to nonmetallic-mineral producers. They are reprinted in full below.

RULES AND REGULATIONS

for carrying out the provisions of Title II of the National Industrial Recovery Act authorizing grants under Sec. 204 to the state highway departments for the emergency construction of public highways and related projects in accordance with the provisions of the Federal Highway Act.

Sec. 1. The term "act" as used herein shall be construed to mean those provisions of Title II of the National Industrial Recovery Act of June 16, 1933 (Public No. 67, 73rd Congress), which authorize the emergency construction of public highways and related projects in accordance with the provisions of the Federal Highway Act.

The term "state" as used herein shall include the Territory of Hawaii and the District of Columbia. The term "national recovery highway funds" shall mean the $400,000,000 of Federal funds authorized under Sec. 204 of [that] act to be granted to the several state highway departments for the construction of public highways and related projects on the Federal-aid highway system and on extensions thereof into and through municipalities and on secondary or feeder roads in accordance with the provisions of the Federal Highway Act. All projects located on the Federal-aid highway system outside municipalities involving the use of such funds shall be designated "National Recovery Highway Projects," indicated by prefixing the letters "NRH" to the project number. All projects located on extensions of the Federal-aid highway system into and through municipalities involving the use of such funds shall be designated "National Recovery Municipal Highway Projects," indicated by prefixing the letters "NRM" to the project number. All projects located on secondary or feeder roads involving the use of such funds shall be designated "National Recovery Secondary Highway Projects," indicated by prefixing the letters "NRS" to the project number.

Sec. 2. All projects under this act shall be initiated by the states and submitted in the same manner as other Federal-aid projects, and all such projects shall be subject to all provisions of the Rules and Regulations of the Secretary of Agriculture for administering the Federal Highway Act, as heretofore promulgated, except such provisions as are in conflict with these rules and regulations.

Sec. 3. Secondary or feeder roads, as referred to in this section of the act, shall be defined as roads which are not now included in the approved system of Federal-aid highways, but which are either part of the state highway system or are important local highways leading to shipping points, or which will permit the coördination or extension of existing transportation facilities, including highway, rail, air and water.

Sec. 4. Not more than 50 per cent. of the funds apportioned to any state under this act shall be applied to projects on the Federal-aid highway system outside the corporate limits of municipalities; not less than 25 per cent. of such funds shall be applied to projects on extensions of the Federal-aid highway system into and through municipalities; and not more than 25 per cent. of such funds shall be applied to secondary or feeder roads until provision has been made for the satisfactory completion of at least 90 per cent. of the initial limiting Federal-aid highway system in such state. Upon a proper showing by any state that, either all needed improvements on extensions of the Federal-aid highway system into and through municipalities can be completed with an expenditure less than 25 per cent. of the state's apportionment, or that municipal authorities are unable or unwilling to obtain the necessary rights-of-way for needed improvements, or for other reasons, the Secretary of Agriculture may revise the above percentages with reference to such state. The reconstruction of existing facilities that are adequate for traffic shall not be considered needed improvements.

Sec. 5. Each state highway department shall submit for approval to the Secretary of Agriculture and through him to the Special Board for Public Works a preliminary statement showing the proposed assignment of the state's apportionment to (1) the Federal-aid highway system outside municipalities, (2) extensions of the Federal-aid highway system into and through municipalities, and (3) secondary or feeder roads. This statement shall list the counties or political subdivisions in which projects to be submitted will be located. A project or projects of one or more of the defined classifications shall be provided in at least 75 per cent. of all counties of the state, unless it be shown either (1) that the number of counties in which need of employment exists constitutes a smaller percentage of the total; or (2) that needed and suitable road-construction projects can not be found in that percentage of the total number of counties. In selecting counties in which projects are to be located, consideration shall be given to the relative need for employment in such counties.

Sec. 6. Upon approval of the preliminary statement in whole or in part each state highway department shall prepare and submit detailed programs of proposed construction of each of the three classes of projects enumerated in the foregoing section, indicating the termini, the character of the work, the estimated cost, and the amount of Federal funds desired. The three programs may be submitted independently and may be so approved in whole or in part. In the selection of projects to be included in these programs priority shall be given to: (a) the closing of gaps in the Federal-aid highway system; (b) the appropriate landscaping of parkways or roadsides on a reasonably extensive mileage; (c) the correlating and supplementing of existing transportation facilities by road, rail, air and water, and providing of service to freight-receiving stations, airports and emergency-landing fields; (d) reconstruction designed to reduce maintenance cost and decrease future state- and local-highway expenditures; (e) providing a large number of small projects designed to employ the maximum of human labor; and (f) the elimination of hazards to highway traffic, such as the separation of grades at crossings, the reconstruction of existing railroad grade-crossing structures, the relocation of highways to eliminate railroad crossings, the widening of narrow bridges and roadways, the building of footpaths, the replacement of unsafe bridges, the construction of routes to avoid congested areas, and the construction of facilities to improve accessibility and the free flow of traffic.

The Secretary and the Board reserve the right to require the construction of roads desired by the U. S. Railroad Coördinator to provide adequate year-round highway service in replacement of branch-line railroad service proposed to be abandoned.

Sec. 7. Surveys and plans, specifications and estimates for all projects under this act in each state shall be prepared under the immediate direction of the state highway department and the construction involved shall be under the immediate supervision of the state highway department. Funds apportioned under this act shall not be available for the payment of any portion of the cost of surveys and plans undertaken prior to the approval of the program. Payment will be made of the actual itemized expenditures for surveys and plans on National Recovery Highway Projects and National Recovery Municipal Highway Projects only upon a showing by the state that the revenues available to the state for such purposes are insufficient to pay such costs. Payment may be made of the actual itemized cost of surveys and plans for National Recovery Secondary Projects. Payment may be made of the actual itemized cost of construction engineering and inspection on all projects. Payment for engineering services will not be made on a percentage basis.

Each state shall maintain at its own expense a state highway department having adequate powers and suitably equipped and organized to discharge to the satisfaction of the Secretary of Agriculture the duties required by this act and these rules and regulations. No part of the cost of surveys, plans, and engineering supervision of construction will be paid to any state which restricts the employment of engineers on such work to residents of the state, unless it shall be shown that a sufficient number of qualified engineers, trained in highway construction, are available within the state.

Sec. 8. All contracts for the construction of highways under this act shall require the contractor to furnish all materials entering into the work, and no requirement shall be contained in any contract in any state providing price differentials for, or restricting the use of materials to, those produced within the state; provided, however, that preference shall be given to the use of materials produced under codes of fair competition approved under the National Industrial Recovery Act.

Sec. 9. No convict labor shall be employed and no materials manufactured or produced by convict labor shall be used on any project constructed under this act.

Sec. 10. (a) All contracts for the construction of highways under this act shall prescribe the minimum rates of wages, as predetermined by the state highway department, which contractors shall pay to skilled and unskilled labor, and such minimum rates shall be stated also in the advertisement for bids and in proposals or bids which may be submitted. The wage rates so determined may be a minimum rate for unskilled labor and a minimum rate for skilled labor, or for skilled labor a minimum rate may be fixed for each class of such labor. Such wages shall be just and reasonable compensation sufficient to provide, for the hours of labor as limited, a standard of living in decency and comfort.

(b) All contracts for the construction of projects under this act shall require that the wages of skilled and unskilled labor shall be paid in legal tender of the United States. All contracts for the construction of projects under this act shall contain a provision that no deduction from the wages of skilled or unskilled labor shall be allowed on account of goods purchased or obligations incurred in any commissary or store owned, leased or otherwise controlled by the contractor. Obligations so incurred shall be subject to collection only in the same manner in which obligations incurred in the ordinary course of business are collectible.

Sec. 11. Contracts for all projects under this act shall contain stipulations that in the employment of labor preference shall be given, where they are qualified, to ex-service men with dependents, and then in the following order: (a) to citizens of the United States and aliens who have declared their intention of becoming citizens, who are *bona fide* residents of the political subdivision and/or county in which the work is to be performed; and (b) to citizens of the United States and aliens who have declared their intention of becoming citizens, who are *bona fide* residents of the state in which the work is to be performed; provided that these provisions shall apply only where such labor is available and qualified to perform the work to which the employment relates.

Sec. 12. Contracts for all projects under this act shall contain a stipulation that (except in executive, administrative and supervisory positions), so far as practicable and feasible, no individual shall be permitted to work more than 30 hr. in any one week. This requirement shall be construed: (a) to permit working time lost because of inclement weather or unavoidable delays during the period of employment in any one week to be made up in the succeeding week or weeks of any one calendar month; and (b) to permit a limitation of not more than 130 hr. work in any one calendar month to be substituted in the contract for the requirement of not more than 30 hr. work in any one week on projects in localities where a sufficient amount of labor is not available in the immediate vicinity of the work. It shall not be considered practicable and feasible to apply either of these limitations to work located at points so remote and so inaccessible that camps are necessary for the housing and boarding of all the labor employed on the work and unemployment has been absorbed in the area of the work, as determined by the state highway department with the approval of the District Engineer of the Bureau of Public Roads and the Director of the United States Employment Service prior to advertisement; provided, however, that in all such cases no individual shall be permitted to work more than 8 hr. in any one day or more than 40 hr. in any one week.

Sec. 13. In order to give effect to the provisions of this act it will be required that the maximum of human labor be used in lieu of machinery wherever practicable and consistent with sound economy and public advantage.

Sec. 14. The specifications for each project shall contain special provisions which shall be in conformity with instructions issued by the Bureau of Public Roads for carrying into effect the stipulations required by these rules and regulations, which provisions shall include a requirement that the contractor shall promptly furnish to the state highway department copies of each pay-roll certified under oath by the contractor or his authorized representative. Such copies shall be available for inspection by the Secretary of Agriculture and the Special Board for Public Works.

Sec. 15. Funds apportioned to the state highway departments for the emergency construction of highways under this act may be used in lieu of state funds to match unobligated balances of previous apportionments of regular Federal-aid authorizations, and such regular Federal aid, so matched, may be used to the maximum extent legally permissible in the construction and reconstruction of projects on the Federal-aid highway system.

Sec. 16. All contracts for work to be done under these regulations shall provide the labor required for such projects and appropriately to be secured through local employment services shall be selected from qualified workers referred by employment agencies designated by the United States Employment Service. The state highway departments shall include the above-stated requirement in their contracts.

Sec. 17. All contracts for projects under this act shall contain suitable stipulations designed to insure that not less than 80 per cent. of the work embraced in the contract, exclusive of items not commonly found in contracts for similar work, or which require highly-specialized knowledge, craftsmanship and/or equipment not ordinarily available in contracting organizations which perform work of the character embraced in the contract, shall be performed by the contractor with his own organization.

Sec. 18. All contracts for projects under this act shall provide that in the performance of the work the contractor, subcontractors, material producers or suppliers shall use only such unmanufactured articles, materials and supplies as have been mined or produced in the United States, and only such manufactured articles, materials and supplies as have been manufactured in the United States substantially all from articles, materials or supplies mined, produced or manufactured, as the case may be, in the United States, unless articles, materials or supplies of the class or kind

(*Continued on page 48*

Preparing Codes for Fair Competition Under Industrial Recovery Act

FOR the purpose of informing trade associations and industrial and labor groups how to proceed in order to share in the benefits of the National Industrial Recovery Act, the National Recovery Administration issued a bulletin (No. 2) entitled *Basic Codes of Fair Competition* on June 19. The most important parts of the bulletin are here reprinted, because the publication has not yet been widely circulated among the nonmetallic-mineral industries.

"The National Recovery Administration is prepared to receive proposed codes and to conduct prompt hearings looking toward their submission to me for approval," said the President when he signed the act. "While acceptable proposals of no trade group will be delayed, it is my hope that the ten major industries which control the bulk of industrial employment can submit their simple basic codes at once and that the country can look forward to the month of July as the beginning of our great national movement back to work."

The following paragraphs cover the procedure necessary to comply with the President's suggestions:

The National Recovery Administration will receive proposed codes at any time after this date at its office in the Department of Commerce Bldg., Washington, D. C. Codes may be submitted by mail and will be promptly examined, and associations or groups submitting them will be given such suggestions as are appropriate for further action. Consistent with the President's statement, the major industries will so far as practical have the first attention of the administrator.

As soon as the proposed code is put in proper form, after consultation with those submitting it, due public notice will be given of a date for a hearing on the code, and at such hearing a reasonable opportunity to be heard will be given to all interested parties, including all affected labor groups, and representatives of consumer organizations, the trade associations or groups submitting codes and any essential minority thereof, other concerns not members thereof, and persons engaged in other steps of the economic process whose service and welware might be affected by the approval of the proposed code. This hearing will be held by a person designated by the administrator and there will be present, to advise that person, experts in the industry under consideration and the labor pertaining thereto, who will be chosen under the supervision of the Secretaries of Commerce and Labor, respectively. All other persons or concerns whose coöperation is desirable in connection with the proposed code shall be entitled to attend such hearings.

After such a hearing the proposed code may be modified at the suggestion of the Administration or otherwise and as so modified, if it is agreed to by representatives of the association or group presenting it and ratified by such association or group under such conditions as the Administration may prescribe, it will be presented to the President for his approval or disapproval or suggested modification, and when finally approved by the President, it shall have the effect prescribed by the National Industrial Recovery Act.

In order to carry out the President's suggestion as quoted [above] and to effect an immediate reduction of unemployment and increase of mass purchasing power, trade associations or groups are invited to submit without delay a basic code covering only such agreements as are consistent with the policy of the act, respecting maximum hours of labor, minimum rates of wages, and such means as each industry may find necessary to protect its constructive and coöperating majority from the wasteful and unfair competition of minorities or recalcitrants. Additions, modifications, and refinements of such basic codes will be considered later upon application by such associations or groups.

The act requires that certain provisions found in subsection (2) of Sec. 7 shall be included in every code and, therefore, no application for the approval of any basic code will be received if it omits or modifies these mandatory provisions, which are as follows:

Every code of fair competition, agreement, and license approved, prescribed, or issued under this title shall contain the following conditions: (1) That employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; (2) that no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and (3) that employers shall comply with the maximum hours of labor, minimum rates of pay, maximum machine-load of employees, and other conditions of employment, approved or prescribed by the President.

It is not the function of the National Recovery Administration to prescribe what shall be in the codes to be submitted by associations or groups. The initiative in all such matters is expected to come from within the industry itself. Neither is it the purpose of the Administration to compel the organization of either industry or labor. Basic codes containing provisions respecting maximum hours of labor, minimum rates of pay, and other conditions of employment, which are in themselves satisfactory, will be subject to approval, although such conditions may not have been arrived at by collective bargaining.

In preparing basic codes, the following principles should be given consideration:

(a) Basic code provisions relating to maximum hours may involve appropriate consideration of the varying conditions and requirements of the several industries and the state of employment therein. An average work week should be designed so far as possible to provide for such a spread of employment as will provide work so far as practical for employees normally attached to the particular industry.

(b) Minimum-wage scales should be sufficient to furnish compensation for the hours of work as limited, sufficient *in fact* to provide a decent standard of living in the locality where the workers reside.

(c) Conditions of employment should contain necessary safeguards for the health and safety of the workers and for stabilization of their employment.

(d) The following principle emphasized in the President's statement should be recognized and adhered to:

I am fully aware that wage increases will eventually raise costs, but I ask that managements give first consideration to the improvement of operating figures by greatly increased sales to be expected from the rising purchasing power of the public. That is good economics and good business. The aim of this whole effort is to restore our rich domestic market by raising its vast consuming capacity. If we now inflate prices as fast and as far as we increase wages, the whole project will be set at naught. *We can not hope for the full effect of this plan unless, in these first critical months, and, even at the expense of full initial profits, we defer price increases as long as possible.*

In the drafting of codes attention is especially directed to this suggestion by the President that the Recovery Administration can not be effective unless the consumer's buying power is protected. There will be full protection for the consumer. The codes should recognize the interest of the public in the matter of prices.

At the hearings described [above] every trade association or group proposing a code should be prepared to establish by evidence the requirements of Sec. 3 (a), Clause 1, of the act which provides:

that such associations or groups impose no inequitable restrictions on admission to membership therein and are truly representative to such trades or industries or subdivisions thereof,

and of Sec. 3 (a), Clause 2, of the act which provides:

that such code or codes are not designed to promote monopolies or to eliminate or oppress small enterprises and will not operate to discriminate against them, and will tend to effectuate the policy of this title.

It is the purpose of the act to encourage a voluntary submission of codes of fair competition and the procedure offered by these provisions for basic codes is intended to simplify and expedite this process. But in the event that codes of fair competition are not voluntarily submitted, attention is invited to other pertinent provisions of the act. It is provided in Sec. 3 (d) of the act that the President upon his own motion, or if complaint is made, may after public notice and hearing prescribe a code of fair competition for a trade or industry or subdivision thereof. Sec. 3 (d) reads as follows:

Upon his own motion, or if complaint is made to the President that abuses inimical to the public interest and contrary to the policy herein declared are prevalent in any trade or industry or subdivision thereof, and if no code of fair competition therefor has theretofore been approved by the President, the President, after such public notice and hearing as he shall specify, may prescribe and approve a code of fair competition for such trade or industry or subdivision thereof, which shall have the same effect as a code of fair competition approved by the President under subsection (a) of this section.

In this same connection, attention should be directed to the requirements of Sec. 7 (b) and (c), which read as follows:

The President shall, so far as practicable, afford every opportunity to employers and employees in any trade or industry or subdivision thereof with respect to which the conditions referred to in clauses (1) and (2) of subsection (a) prevail, to establish by mutual agreement, the standards as to the maximum hours of labor, minimum rates of pay, maximum machine-load of employees, and such other conditions of employment as may be necessary in such trade or industry or subdivision thereof to effectuate the policy of this title; and the standards established in such agreements, when approved by the President, shall have the same effect as a code of fair competition, approved by the President under Subsec. (a) of Sec. 3.

(c) Where no such mutual agreement has been approved by the President he may investigate the labor practices, policies, wages, hours of labor, and conditions of employment in such trade or industry or subdivision thereof; and upon the basis of such investigations, and after such hearings as the President finds advisable, he is authorized to prescribe a limited code of fair competition fixing such maximum hours of labor, minimum rates of pay, and other conditions of employment in the trade or industry or subdivision thereof investigated as he finds to be necessary to effectuate the policy of this title, which shall have the same effect as a code of fair competition approved by the President under Subsec. (a) of Sec. 3. The President may differentiate according to experience and skill of the employees affected and according to the locality of the employment; but no attempt shall be made to introduce any classification according to the nature of the work involved which might tend to set a maximum as well as a minimum wage.

Under the foregoing provisions of the act if no code or agreement establishing standards as to maximum hours of labor, minimum rates of pay, and conditions of employment has been approved by the President, the President is authorized under the foregoing section 7 (c) to prescribe a limited code upon the basis of such investigations and after such hearings as he finds advisable.

Hugh S. Johnson
Administrator

Approved by:

NATIONAL INDUSTRIAL RECOVERY BOARD.

Hon. Daniel C. Roper, *Chairman*
Hon. Homer S. Cummings
Hon. Harold L. Ickes
Hon. Henry A. Wallace
Hon. Frances Perkins
Hon. Charles H. March
Hon. Lewis W. Douglas
Hon. John Dickinson, *Executive Secretary*

$400,000,000 for Roads (from page 46)

to be used, or the articles, materials or supplies from which they are manufactured are not mined, produced or manufactured, as the case may be, in the United States in sufficient and reasonably-available commercial quantities and of a satisfactory quality; provided, however, that if a state highway department shall find that in respect to some particular articles, materials or supplies it is impracticable to make such requirement, or that it would unreasonably increase the cost, an exception, with the approval of the Bureau of Public Roads, shall be noted in the specifications as to those particular articles, materials or supplies, and a public record shall be made of the findings which justified the exception.

Sec. 19. Any work done by direct labor under this act shall be subject to these rules and regulations. All materials used on such work shall be purchased under approved specifications on competitive bids after proper advertisement.

Sec. 20. No invitation for bids upon any project shall be advertised until the plans for such project have been recommended for approval by the District Engineer of the Bureau of Public Roads, and no contract for any such project shall be entered into, or award therefor made, by any state without prior concurrence in such action by the District Engineer of the Bureau of Public Roads. Approval will not be given to any procedure or requirement designed to prevent the award of contracts to qualified contractors non-resident of the state in which the work is located.

Sec. 21. Project agreements for secondary or feeder-road projects shall provide for the maintenance of such projects by the state where the law permits the state to undertake such maintenance; otherwise the state shall submit, in the form prescribed by the Secretary of Agriculture, an agreement with the county or other political subdivision for such maintenance.

Sec. 22. Project agreements for projects on extensions of the Federal-aid highway system into and through municipalities shall provide for the maintenance of such projects by the state where the law permits the state to undertake such maintenance; otherwise the state shall submit, in the form prescribed by the Secretary of Agriculture, an agreement with the municipality or other political subdivision for such maintenance.

Sec. 23. Any contractor who deliberately violates the spirit and intent of these rules and regulations or the special provisions issued thereunder shall not be eligible to bid upon any further work involving "National Recovery Highway Funds."

Sec. 24. No payments will be made to any state on account of work performed on any project which has not been done in accordance with these rules and regulations and the special provisions issued thereunder.

Sec. 25. These regulations shall apply to National Recovery Highway Projects, National Recovery Municipal Highway Projects and National Recovery Secondary Highway Projects as defined in Sec. 1 hereof.

June 23, 1933
R. G. Tugwell
Acting Secretary of Agriculture

Approved June 23, 1933:
SPECIAL BOARD FOR PUBLIC WORKS
Harold L. Ickes
Chairman

Magnesium Industry in 1932

The quantity of magnesium ingot sold or used in 1932 was 791,699 lb. valued at $228,653. This represents an increase of 36.3 per cent. in quantity and 14.5 per cent. in value, compared with 1931.

The Opportunities of Trade Associations Under Industry-Control Law

Far-Sighted Bodies Will Adopt Codes of Public-Interest Conduct at Once

By F. H. FIGSBY
Partner, Ernst & Ernst

TRADE associations need not wait until formal regulations under the new industry-control law are issued by the government in order to gather the benefits of the legislation. It is both possible and desirable to set in motion at once within trade associations many measures which are certain to fit into the new scheme.

It should be recognized that the government under the new system hopes to accomplish the following results:

(1) To raise wages and create employment, in order to increase consumer purchasing power, and in order to provide relief from the growing burden of unemployment.

(2) To raise prices by agreements among producers, partly by the process of artificially putting a stop to the cut-throat competition which has driven prices down along a destructive spiral, partly by the process of agreeing on the proper elements of costs, which should be the basis for prices.

(3) To rationalize trade and industry, as has already been done in England, Germany, France, Italy, and Russia, so that each trade and industry can be directed and controlled more or less as a unit, rather than as a loosely-associated aggregation of independent and competing units.

In this connection it is pertinent to observe that the regimentation of industry is going forward under compulsion of circumstances in countries which are essentially radical (mainly the U. S. S. R.), in countries which are patently socialistic (Germany, England, France), in countries where the political-dictatorship idea is dominant (Italy, Germany), and in the one country which is more conservative than all the others (the United States).

The obvious conclusion is that forces of economic and social circumstances are dictating these new alignments and organizations of trade and industry, and that political force and varying political ideas are merely the instrumentalities through which the reforms are being effected.

Trade associations in the United States should be recognized for what they have been and for what they may become. Frankly, in the past some of them have been merely loose affiliations of units which had interests in common, but whose coöperative activities were limited largely to convivial personal handshaking at annual meetings and whose principal activities between the meetings consisted of trying to do each other out of business.

The trade association of the future must regard itself as having a job. The leadership or presidency may carry honor, but the honor will be incidental, and will be earned at the cost of much labor. The permanent secretary may be the same man as in the past, provided he can free himself or be freed by his membership of the burdensome ordeal of temporary policy back-patting, in order that he may attend to the permanent principles which are to the best interest of his members.

One reason why the healthy, active, alert, aggressive trade association is so important in the current situation is that it is in position to determine whether our future national policy must be in the general direction of state socialism, with all its crudities, or in the direction of something even more radical. The trade association, if it is good enough in the future, can steer us into the middle course, which is this: Private ownership, private management, private initiative, plus control, or supervision, or direction for the public interest. This middle course is the aim of the new law. The law is so framed as to leave initiative to trade groups if they will take it; otherwise the government will dictate.

The trade association, therefore, has been vested with tremendous authority. But the authority is merely potential. If it is seized and exercised by the trade association, this is perhaps best in the public interest. If the government is finally required to assume the dictatorial authority, this is less good, for the government is illy-informed of the multitudinous complications involved in the conduct of business. Even a well-intentioned government would commit tremendous blunders. The way to prevent the tremendous blunders is for trade associations to seize their responsibilities, and to administer them wisely. There is no time for delay. The things to be done include the following, although the order of importance may be different for different associations:

Code.—Each trade and industry needs a general code, which will represent a statement of the practices which the industry considers good in its own interest and in the public interest (the two being ultimately the same). In the past these codes have related largely to selling practices, such as labeling, advertising, discrimination, allowances, rebates, special discounts, freight allowances, terms, returned goods, etc. In the future the codes must cover more ground, such as wages, hours, working conditions, costs, price factors, etc.

Wages.—Wages have been beaten down by competitive selling practices, so that in many industries wages have borne the brunt of the short-sighted activities of managements. Wages *en masse* represent purchasing power *en masse,* so that industrial competition in all its phases has produced merely a popular inability to consume the products of industry. The ultimate consumer (mainly the wage-earner) represents the broad foundation on which all business is built, and the capital-goods producer is merely one of the layers along toward the top of the pyramid. If wages can be raised by agreement within a trade or industry, and if additional agreements can be reached to pass the cost of the higher wages along to the consuming public, then one step will have been taken toward checking the downward spiral of business, and toward stabilizing business at a level which will yield satisfactory profits.

Hours of Labor.—The arguments for shortening the hours of labor are comparable to those for paying proper wages. It is economically inevitable that working hours be shortened, due to technological improvements. Wages can be raised and hours can be lowered only through coöperative action by all the units in a trade or industry, for wages and hours are elements of competitive costs. The trade association is a good instrumentality for effective coöperative action. Collective bargaining of some character between managements and workmen is inevitable.

Prices.—The whole problem of successful business operation rests on the problem of selling prices. These must be high enough to cover costs and to represent a reasonable profit. The profit may vary, according to the efficiency of different producers. A good job for the trade association is to establish rules which make reasonably certain that the selling price shall not be below the cost of production.

Price Fixing.—There is no easy way, either in past practice or in future practice, of fixing selling prices which will permanently assure a profit to producers. Arbitrary arrangements break down, either under pressure of the anti-trust laws (which now are to be largely suspended), or under pressure of the economic laws of competition (which always operate). Even if producers of the same commodity do not compete, a substitute commodity is apt to compete. Thus, price-fixing by and of itself is not to be relied upon, either with or without law. It is possible, however, to provide by agreement that selling prices shall not be below the costs of production. Whether these costs of production shall be individual for each unit, or an average for a group, is not yet determinable. Doubtless the practical administration of the new law will allow for a compromise, which will provide larger profits for efficient producers than for inefficient producers.

Uniform Accounting.—There is no escape, regardless of the practices to be finally agreed upon, from the necessity for uniform methods of cost-accounting among all members of a trade or industry. Without uniform accounting practices the members do not speak the same language, thus making difficult the comparison of the elements entering into the cost of doing business. They have no common ground on which to meet and discuss their common problems. It is essential that they follow the same rules by which they shall determine their costs and their profits.

Competition.—No business man should delude himself by thinking that he will ever be freed from all competition with his fellow producers, or from the competition of satisfactory substitute articles. In an absolute sense there is no way of suppressing competition. The only object to be sought is the regulation of competition by certain rules. To devise and to enforce and to modify these rules from time to time is the proper function of the trade association.

Government compulsion is an influence to be avoided. It can be avoided only by those business groups which run ahead of the government in their recognition of what constitutes public-interest conduct on their part.

Aggregates Code *(from page 25)*

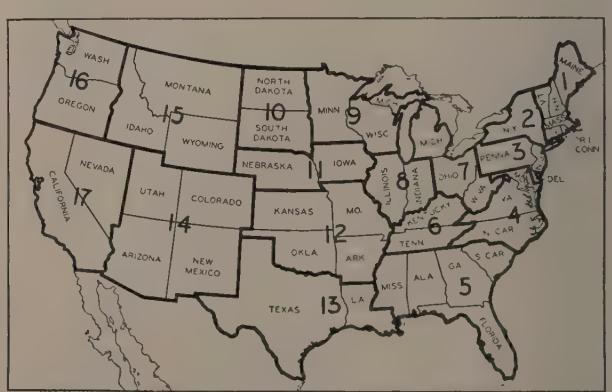
APPENDIX I.

Suggested Outline of
Administrative Regions for Administration of Code of Fair Competition
for the
Crushed-Stone, Sand-and-Gravel and Slag Industries

These are *suggested* administrative regions only; *they bear no necessary relationship to marketing areas.* Further subdivisions will undoubtedly prove to be desirable for purposes of facilitating administration and regulating marketing problems.

These regions have been divided on state lines primarily because most of the local aggregate associations are now so organized; further reasons are, the similarity of specification problems, the possible influence of state laws, etc.

Regional subdivisions can be made intelligently only with the advice and coöperation of the producers within a region. It is believed that they should embrace areas in which a number of producers are serving the same principal market or markets. In many cases these subdivisions may, in order to serve their purpose, overlap more than one administrative region.



Suggested outline of administrative regions for stone, sand-gravel and slag fair competition code. They must be further subdivided for regulating marketing problems.

MEN OF THE INDUSTRY

J. D. JOHNSON

MR. JOHNSON, president and general manager of the Canada Cement Co., Ltd., Montreal, Quebec, is one of the youngest of the leading executives in Canadian industry. He was born at Malagash, Nova Scotia, on October 29, 1881, and received his education in the public and high schools of that province. His business career began with the Dominion Iron & Steel Co. from 1900 to 1902. He was then with the Canadian Portland Cement Co., and the Ravenlake Portland Cement Co. as secretary, and the Lehigh Portland Cement Co., Toronto, as sales manager. In 1909 he joined the Canada Cement Co. as sales manager, becoming general sales manager in 1919, vice-president and general manager in 1927, and president in January, 1931.

Personal Mention

W. I. Sanborn, vice president and general manager of the Lehigh Stone Co., Kankakee, Ill., attended the trade conference of business leaders which was held recently in Washington, D. C., at the suggestion of President Roosevelt.

Ashby Snow, president of the Portland Cement Co. of Utah, was recently elected a director of the Z. C. M. I., Salt Lake City, a pioneer western mercantile institution doing an annual business of many millions of dollars.

T. F. Thornton was recently appointed sales manager for the Detroit district with headquarters in the Ford Bldg., by the Babcock & Wilcox Tube Co., Beaver Falls, Pa.

Frederick L. Pierce has resigned as vice president of Cutler-Hammer, Inc., Milwaukee, Wis., but is retaining his position on the board of directors. Mr. Pierce had not been active in the business for some time. **Henry F. Vogt,** treasurer, has also been made a vice president.

Fred Davis, superintendent of the plant of the Santa Cruz Portland Cement Co., Santa Cruz, Cal., for over 23 years retired on June 1 because of ill health. He is succeeded in this position by **Joseph J. Riordan** who has been in the employ of the company since 1907 and who has been assistant superintendent since 1924. Mr. Davis expects to maintain his home in Santa Cruz and will return there after a visit to the Century of Progress exhibition in Chicago.

Joseph J. Riordan.

R. B. Wilson has been appointed manager of the St. Louis plant of Joseph T. Ryerson & Son, Inc., after 20 years of service with the company.

H. Vanderwerp, vice-president of the Medusa Portland Cement Co., Cleveland, O., was recently appointed general superintendent of all plants, succeeding **W. L. White, Jr.,** resigned. Mr. Vanderwerp first came with Medusa when that company acquired the Manitowoc Portland Cement Co., Manitowoc, Wis. Since that time he has been in charge of the Chicago office and has also been active in engineering development work. His headquarters are now in Cleveland.

You Can't Go It Alone!

The "new deal" for industry is based on voluntary c öperation and if you don't get in line you'll be left outside and that will be just too bad from every point of view. You'll be forced to do what you don't want to do, and that hurts. On July 13 and 14 your place is in Chicago with your fellow industrialists.

Fred H. Richardson, district engineer for the Portland Cement Assn., with headquarters in Salt Lake City, Utah, was recently elected president of the Engineering Council of Utah.

Hank Wolcott has been added to the Chicago sales force of the Equipment Corp. of America. He was formerly for many years district sales manager in Chicago for the P & H line and was later with the Lima Locomotive Co.

Fred Swineford, chief engineer of the Ohio Crushed Stone Ass'n., was chosen president of the Ohio Engineering Society at its recent annual meeting.

Obituary

Fred J. Hanson, 54, engineer in charge of experimental and research laboratories, Wisconsin Motor Co., Milwaukee, Wis., died on May 12.

George C. Barlow, 50, president and general manager of the C. S. Barlow and Sons Co., Tacoma, Wash., ready-mixed concrete producers, died recently at his home in that city.

Frank V. Sargent, 53, former New England district manager of the Chicago Pneumatic Tool Co., died at his home in Watertown, Mass., on May 17.

William H. Meyers, nationally known expert on road building and for the past 43 years associated with the asphalt department of the Standard Oil Co. of Indiana, died recently at his home in Chicago.

Ohio Finishing Lime Plants Raise Prices

New price lists being mailed to building-supply dealers by various finishing-lime manufacturers in northwestern Ohio indicate advances in the prices of the products of these manufacturers. The price to the dealer f.o.b. the plant is now $9.00 per ton on finishing lime, $10.00 per ton on fibered lime, $7.50 per ton on masons' hydrate, $6.75 per ton on agricultural lime, and $16.50 per ton on lime in 10-lb. bags. Prices previously quoted were as low as $5.50 per ton on finishing lime, $4.75 per ton on masons' hydrate, $4.25 per ton on agricultural lime, $6.50 per ton on fibered lime, and $9.50 per ton on lime in 10-lb. bags. It it also noted that there is an increase in activity in this district which is regarded as more than seasonal. One manufacturer is starting repairs on a battery of kilns that have been out of service for a long time, and there seems to be a general feeling that better times are ahead for this industry.

Coming Events

July 13-14, 1933. Chicago. Code of Fair Competition Meetings, National Crushed Stone Assn. (J. R. Boyd, sec., Washington), National Sand & Gravel Assn. (V. P. Ahearn, exec. sec., Washington), and National Slag Assn. (J. H. Love, sec.-treas., Cleveland) at the Palmer House. Independent meetings of individual associations on July 13, joint meeting of all on July 14.

October 2-6, 1933, Chicago, Ill.—Twenty-second Annual Safety Congress, National Safety Council, Stevens Hotel. W. H. Cameron, secretary, 20 N. Wacker Drive, Chicago, Ill.

Aggregates Shipments

CONTINUED stagnation in building and highway construction resulted in new lows for shipments of sand, gravel, and crushed stone in the first quarter of 1933. Class I railroads originated only 2,907,143 short tons of sand and gravel, a decline of 13.8 per cent. from the corresponding period of 1932. This figure does not include nonrevenue railroad ballast, glass sand, or molding sand. Furthermore, no adjustment has been made for possible changes in the ratio of railway to truck or barge shipments. In 1932, according to available estimates, only 35.6 per cent. of the sand and gravel sold or used by producers was shipped by railway compared with 38.9 per cent. in 1931.

Barge shipments of sand and gravel in the Pittsburgh district decreased from 151,493 short tons during the first quarter of 1932 to 125,239 short tons in 1933, a drop of 17.3 per cent.

Crushed stone fared better, railway shipments dropping only 2.7 per cent. from 1,848,455 short tons in the first quarter of 1932 to 1,798,740 short tons in 1933.

Shipments of furnace slag during the first quarter registered the greatest decline of the three classes of aggregates, 28.7 per cent., dropping from 414,154 short tons in 1932 to 295,395 short tons in 1933.

Foreign trade in sand and gravel is of little consequence, but it is interesting to note that both imports and exports of sand and gravel during the first quarter of 1933 dropped precipitously from 1932.

Market Indicators. — Total shipments of all the aggregates accounted for amounted to 5,126,517 short tons

By H. H. HUGHES, A. T. COONS, and E. R. PHILLIPS

Bureau of Mines, Department of Commerce

THIS is the third of a series of articles relating to statistics of the aggregates industries. Studies of this kind are especially pertinent at present in view of the provisions of the National Industrial Recovery Act. Additional detailed information, of course, will be required by the trade associations and by the government in order that the act may be administered properly, but the work of the Bureau of Mines represents the first real effort to establish a current statistical record of aggregates production. The first two installments in this series appeared in the May and June issues of PIT AND QUARRY.—Editor.

during the first quarter of 1933, a decline of 11.4 per cent. from the total of 5,788,277 short tons in the same quarter of 1932. This decrease was slightly in excess of the drop of 9.5 per cent. in the index of industrial production compiled by the Federal Reserve Board.

Portland-cement consumption generally is accepted as one of the best indicators of the demand for aggregates. The shipments of cement in the first quarter of 1933 declined 20 9 per cent. from the corresponding quarter of 1932. The spread between the shipments of aggregates and those of cement may reflect activity in the construction of low-type roads. This deduction is further substantiated by the relatively-small decline in crushed-stone shipments as compared with sand and gravel, crushed stone being a preferred material for waterbound macadam and other types of low-cost stone roads.

The indicated domestic demand for petroleum and lake asphalt also fell off considerably, declining 23.4 per cent. from the first quarter of 1932 to the same period of 1933. Inasmuch as the shipments of prepared roofing during the first quarter declined only 2 per cent. from 1932 to 1933 and the production of dry roofing felt dropped only about 16 per cent., the quantity of asphalt used for paving during the first three months of 1933 apparently decreased more than the statistics of the domestic demand indicate.

Current statistics of highway construction are limited to figures on concrete-pavement contract awards compiled by the Portland Cement Assn. The total contracts awarded during the first quarter of 1933 declined 27.7 per cent. from 1932. Road contracts dropped nearly as much, 26.9 per cent.

Building construction dwindled to unbelievably-low levels during the first three months of 1933. According to the reports of the F. W. Dodge Corp., the total floor space of contracts awarded in the 37 states east of the Rocky Mountains amounted to only 8,575,000 sq. ft., a drop of 38.5 per cent. from the same period of 1932. A comparison of the residential contracts awarded during the two periods reveals that their decline was even more severe, 48.5 per cent. On the other hand, the value of engineering-construction awards dropped only 15.7 per cent.

Table I gives a summary of the salient statistics of the aggregates industries, and the data on railway shipments are plotted in Fig. 1.

Public Works.—These data on building and highway construction suggest a pessimistic outlook for the aggregates industries, but it must be remembered that the first quarter of 1932 was a unique period in the industrial life of the United States. Industry coasted downhill during the first two months of the year while awaiting the inauguration, and the ensuing bank holiday stagnated virtually all lines of business activity. Since the middle of March many business indicators have been climbing steadily upward, and, while highway and building activity failed to share extensively in this improvement, remaining far below the level for any post-war year, encouraging trends have been noted even in the construction industry since the end of the first quarter.

The outlook, moreover, has been vastly improved by the National Industrial Recovery Act. The public-

Table I—SUMMARY OF MOVEMENTS OF AGGREGATE MATERIALS AND INDICATORS OF THEIR MARKETS IN THE FIRST QUARTER OF 1933

	First Quarter		
	1932 Jan.-Mar.	1933 (*a*) Jan.-Mar.	Change from 1932 (*per cent.*)
Railway shipments, Class I roads (*b*) (excludes nonrevenue railroad ballast)			
Sand and gravel (*c*) ..... *short tons*	3,374,175	2,907,143	−13.8
Crushed stone (*d*) ..... *short tons*	1,848,455	1,798,740	− 2.7
Furnace slag ..... *short tons*	414,154	295,395	−28.7
Water shipments, Pittsburgh district (*e*)			
Sand and gravel ..... *short tons*	151,493	125,239	−17.3
Foreign trade in sand and gravel			
Exports to all countries ..... *short tons*	16,548	5,134	−69.0
Imports from all countries (*f*) ..... *short tons*	9,166	4,384	−52.2
Total aggregates accounted for ..... *short tons*	5,788,277	5,126,517	−11.4
General business activity			
Portland cement shipments (*g*) ..... *bbl.*	10,484,000	8,290,000	−20.9
Indicated domestic demand, petroleum and lake asphalt (*g*) *short tons*	339,896	260,221	−23.4
Index of industrial production (*h*)	63	57	− 9.5
Highway construction, concrete pavement contract awards (*i*)			
Total, monthly average ..... *sq. yd.*	3,928,000	2,841,000	−27.7
Roads only, monthly average ..... *sq. yd.*	3,598,000	2,629,000	−26.9
Building construction contract awards			
Total floor space, monthly average (*j*) ..... *sq. ft.*	13,941,000	8,575,000	−38.5
Residential, floor space, monthly average (*j*) ..... *sq. ft.*	7,172,000	3,694,000	−48.5
Engineering construction, value, monthly average (*k*)	$84,545,000	$71,280,000	−15.7

(*a*) Figures may be subject to revision. (*b*) Interstate Commerce Commission. (*c*) Excludes glass and molding sand. (*d*) Excludes fluxing stone. (*e*) Chief Statistician, Board of Engineers for Rivers and Harbors. (*f*) Excludes glass sand. (*g*) Bureau of Mines. (*h*) Federal Reserve Board; recomputed to base 1928-100. (*i*) Portland Cement Association. (*j*) F. W. Dodge Corp. (*k*) *Engineering News-Record.*

Table II—SUMMARY OF STATISTICS OF THE SAND AND GRAVEL INDUSTRY IN THE UNITED STATES, 1931-1932.

	1931	1932 (*a*)	Apparent Change from 1931 (*per cent.*)
Sand and Gravel Sold or Used by Producers:			
Total ..... *short tons*	153,479,044	89,000,000	−42.0
Value	$86,280,320	$46,280,000	−46.4
Average value per ton	$0.56	$0.52	− 7.1
Sand ..... *short tons*	64,492,826	36,250,000	−43.8
Value	$36,696,746	$19,212,500	−47.6
Average value per ton	$0.57	$0.53	− 7.0
Gravel ..... *short tons*	88,986,218	52,750,000	−40.7
Value	$49,583,574	$26,902,500	−45.7
Average value per ton	$0.56	$0.51	− 8.9
Sand Sold or Used by Producers, by Uses:			
Glass ..... *short tons*	1,677,882	1,330,000	−20.7
Molding ..... *short tons*	2,138,305	1,100,000	−48.6
Building ..... *short tons*	25,178,572	11,200,000	−55.5
Paving ..... *short tons*	27,459,581	17,000,000	−38.1
Grinding and polishing ..... *short tons*	607,589	400,000	−34.2
Engine ..... *short tons*	1,604,123	1,300,000	−19.0
Fire or furnace ..... *short tons*	88,189	52,000	−41.0
Filter ..... *short tons*	55,319	38,000	−31.3
Other (*b*) ..... *short tons*	5,683,266	3,830,000	.....
Gravel Sold or Used by Producers, by Uses:			
Building ..... *short tons*	21,426,814	10,500,000	−51.0
Paving ..... *short tons*	56,716,230	36,250,000	−36.1
Railroad ballast (*c*) ..... *short tons*	10,843,174	6,000,000	−44.7

(*a*) Figures for 1932 are preliminary estimates based on: (1) Shipments of sand and gravel by railway and by waterway. (2) Analysis of conditions in consuming industries; and (3) trend indicated by partial returns from producers. (*b*) Includes some sand used for railroad ballast, fills, and similar purposes. (*c*) Includes some gravel used for fills and other purposes; in 1931, 8,814,907 tons of gravel valued at $2,898,598 was used exclusively for ballast.

works section of this bill provides $3,300,000,000 for construction, much of which is to be spent for highways, bridges, overhead crossings, and other similar structures requiring large quantities of aggregates. It is hoped that this enormous public-works program will also stimulate private building. A boom in residential construction is predicted by many authorities, and in the commercial field there is a growing demand from the renting public for rebuilding or remodelling of structures now obsolete.

Along with the anticipated upswing in business for aggregates producers there is a prospect for fair prices being assured under the industrial-control section of the National Industrial Recovery Act, which provides for the establishment of "codes" under which the aggregates industries, in common with virtually all others, are now organizing to operate. The full import of this stupendous emergency measure can not yet be fully visualized but, for the first time in many months, there now exists ample cause to be optimistic about the future of aggregates production.

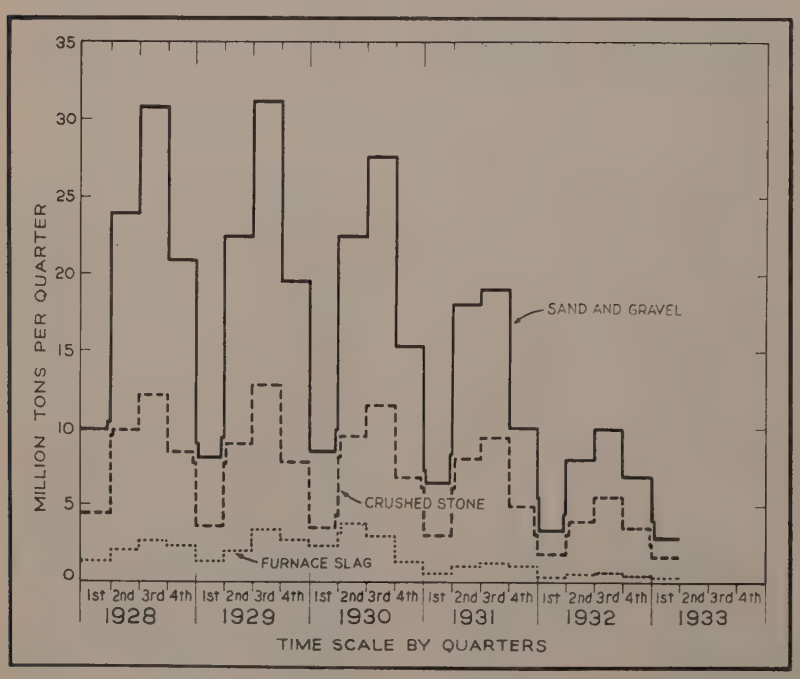


Fig. 1. Railway shipments of sand and gravel, crushed stone, and slag, excluding railroad ballast (non-revenue), glass and molding sand, and fluxing stone, as reported by all Class I railroads to the Interstate Commerce Commission.

Aggregates Production in 1932.—In a previous installment of this series the quantity of sand and gravel sold or used by producers was estimated at 87,500,000 short tons and the quantity of crushed stone at 44,800,000 short tons. Partial returns received from producers indicate that these figures may be slightly low, and the best estimates now available reveal that sand-and-gravel production in 1932 amounted to about 89,000,000 short tons and crushed-stone about 46,800,000 short tons. A summary of statistics of crushed and broken stone was published by the Bureau of Mines as Mineral Market Report No. 207 released June 1, 1933. Details of estimates of sand-and-gravel production are summarized in Table II.

Illinois River Traffic Shows Increase in 1932

According to the U. S. Engineer's office at Peoria, Ill., there was an increase of 193 per cent. in value and 34 per cent. in tonnage handled on the Illinois River in 1932, compared with the previous year. A total of 189,176 tons of commerce with a value of $8,804,732 was handled. This consisted chiefly of grain, cement, sand and gravel, machinery and package freight.

Federal Crushed Stone Corp. Wins Damage Suit

In a recent decision handed down by the Judge of the Supreme Court, Erie County, N. Y., in the case of a damage action brought against the Federal Crushed Stone Corp. of Buffalo, N. Y., for damages to a hotel building caused by blasting, and dust and smoke nuisance, the case was dismissed. The judge's decision was based on two distinct points, one that the area in which the Cheektowaga plant and quarry of the company are situated is and has been for many years an industrial area, in which case the company would not be liable for damages even if it were caused by their operations. It was proven to the judge's satisfaction that the company conducts operations in a careful and reasonable manner. Secondly, if any damages were caused by dust and smoke they were so negligible that they would not justify any damages. Representatives of various powder companies as well as those of other stone companies testified in the case and rendered valuable aid to the defendant.

Correction

In an article published in the June issue of PIT AND QUARRY it was erroneously stated that E. J. Krause, president of the Columbia Quarry Co., is chairman of the Midwest Agricultural Limestone Institute. Mr. Krause is chairman of the executive committee of this organization which has its office at Kankakee, Ill.

Latest Portland-Cement Statistics

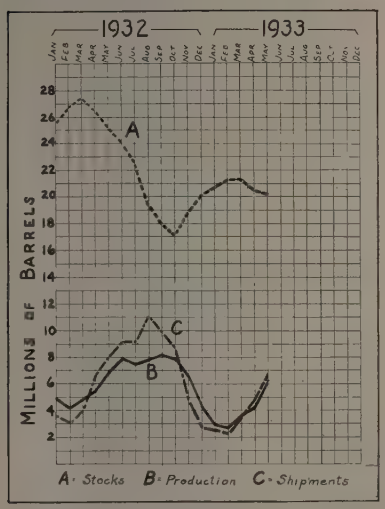


Chart showing monthly production, shipments and stocks on hand at end of month from January, 1932, to May, 1933.

THE Portland-cement industry in May, 1933, produced 6,266,000 bbl., shipped 6,748,000 bbl. from the mills, and had in stock at the end of the month 20,060,000 bbl. Production of Portland cement in May, 1933, showed a decrease of 9.4 per cent. and shipments a decrease of 15.9 per cent., as compared with May, 1932. Portland cement stocks at mills were 21.0 per cent. lower than a year ago.

The statistics here given are compiled from reports for May, received by the Bureau of Mines, from all manufacturing plants except four, for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 164 plants at the close of May, 1933, and of 165 plants at the close of May, 1932.

RATIO (*per cent.*) OF PRODUCTION TO CAPACITY (*164 plants*)

	May		April	March	Feb.
	1932	1933	1933	1933	1933
The month	30.2	27.4	18.9	16.1	13.4
The 12 months ended	38.9	26.0	26.2	26.7	27.1

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1932 AND 1933 (*In thousands of barrels*)

Month	Production		Shipments		Stocks At End of Month	
	1932	1933	1932	1933	1932	1933
January	5,026	2,958	3,393	2,502	25,778	20,624
February	3,971	2,777	3,118	2,278	26,657	21,125
March	4,847	3,684	3,973	3,510	27,545	21,298
April	5,478	4,183	6,536	4,949	26,496	a20,542
May	6,913	6,266	8,020	6,748	25,394	20,060
June	7,921	.....	9,264	.....	24,043	.....
July	7,659	.....	9,218	.....	22,512	.....
August	7,835	.....	10,968	.....	19,398	.....
September	8,210	.....	9,729	.....	17,878	.....
October	7,939	.....	8,743	.....	17,084	.....
November	6,462	.....	4,782	.....	18,788	.....
December	4,248	.....	2,835	.....	20,205	.....
Totals	76,509	.....	80,579	.....	.....	.....

PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1932 AND 1933 (*In thousands of barrels*)

Month	Production		Stocks End of Month		Month	Production		Stocks End of Month	
	1932	1933	1932	1933		1932	1933	1932	1933
January	6,107	3,036	8,184	6,092	July	6,613	.....	7,889	.....
February	5,176	3,110	9,375	6,422	August	7,078	.....	7,175	.....
March	5,443	4,147	10,025	6,890	September	7,703	.....	6,708	.....
April	5,924	4,520	10,511	a7,146	October	7,259	.....	6,093	.....
May	6,273	5,845	9,922	6,759	November	6,290	.....	5,938	.....
June	6,803	.....	8,877	.....	December	4,335	.....	5,995	.....

a Revised.

DISTRIBUTION OF CEMENT

Shipped to—	April (*a*)		May		Shipped to—	April (*a*)		May	
	1932	1933	1932	1933		1932	1933	1932	1933
Alabama	44,565	117,113	26,007	130,896	New Jersey	297,700	184,998	354,171	252,625
Alaska	524	1,074	2,259	903	New Mexico	24,577	39,006	20,550	11,972
Arizona	15,893	10,305	15,430	13,226	New York	970,867	503,554	1,095,796	874,417
Arkansas	14,534	77,517	17,496	83,686	North Carolina	55,225	39,612	52,396	41,121
California	455,498	410,282	400,264	489,827	North Dakota	19,740	12,777	22,113	17,159
Colorado	61,974	35,589	60,878	30,148	Ohio	310,376	200,272	392,409	292,022
Connecticut	94,490	45,492	114,826	123,156	Oklahoma	123,596	170,719	124,276	155,381
Delaware	28,895	32,078	38,984	47,636	Oregon	71,357	35,296	58,860	44,353
Dist. of Col	97,351	73,324	94,829	91,904	Pennsylvania	427,501	353,170	450,430	498,529
Florida	39,674	58,331	33,183	73,109	Porto Rico	5,645	9,613	4,875	7,191
Georgia	82,155	64,568	93,256	53,172	Rhode Island	31,523	20,577	37,280	47,818
Hawaii	29,953	14,145	26,370	11,044	South Carolina	55,309	26,081	43,529	26,530
Idaho	12,480	10,062	10,963	11,455	South Dakota	27,070	17,808	20,924	34,370
Illinois	335,544	171,203	703,571	177,861	Tennessee	98,855	136,572	103,203	128,277
Indiana	157,969	108,666	310,262	172,464	Texas	403,806	354,811	358,964	360,532
Iowa	145,776	97,511	182,684	193,695	Utah	15,997	16,320	16,116	15,926
Kansas	126,952	90,448	127,362	81,970	Vermont	15,312	10,431	25,911	13,794
Kentucky	90,728	113,952	127,033	149,151	Virginia	86,856	91,407	88,465	100,649
Louisiana	58,675	48,230	79,682	64,344	Washington	163,168	67,365	199,080	52,800
Maine	26,384	15,658	36,870	33,625	West Virginia	65,620	59,766	86,484	54,844
Maryland	140,479	81,995	168,539	78,427	Wisconsin	176,417	90,703	227,413	178,181
Massachusetts	209,812	94,101	249,071	193,170	Wyoming	7,547	5,608	10,626	8,131
Michigan	179,013	98,938	304,783	295,721	Unspecified	24,551	11,306	7,406	5,235
Minnesota	164,514	108,377	348,504	210,463		6,514,855	4,866,087	7,983,982	6,634,362
Mississippi	25,123	45,380	14,928	50,862	Foreign countries	21,145	82,913	36,018	74,638
Missouri	250,745	140,758	442,725	227,115					
Montana	18,034	14,012	12,840	20,183					
Nebraska	68,633	173,435	71,205	225,751	Total shipped from cement plants	6,536,000	4,949,000	8,020,000	b6,709,000
Nevada	36,163	41,035	47,891	51,316					
New Hampshire	23,710	14,736	20,082	26,225					

a Includes estimated distribution of shipments from 3 mills each month.
b Revised figures.

PRODUCTION AND STOCKS OF CLINKER (Unground Cement), BY DISTRICTS, in MAY, 1932 and 1933 (*In thousands of barrels*)

District	Production		Stocks at end of Month	
	1932	1933	1932	1933
Eastern Pa., N. J., and Md	1,149	1,448	985	889
New York and Maine	551	345	950	291
Ohio, Western Pa., and W. Va	404	675	1,007	728
Michigan	618	456	1,234	937
Wis., Ill., Ind., and Ky	644	360	1,323	845
Va., Tenn., Ala., Ga., Fla., and La	562	577	567	408
Eastern Mo., Ia., Minn., and S. Dak	903	450	701	395
W. Mo., Neb., Kan., Okla., and Ark	469	386	822	343
Texas	248	328	335	169
Colo., Mont., Utah, Wyo., and Idaho	101	163	130	281
California	420	606	1,599	1,308
Oreg. and Wash	204	51	269	165
Totals	6,273	5,845	9,922	6,759

a Revised

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN MAY, 1932 AND 1933, AND STOCKS IN APRIL, 1933 (*In thousands of barrels*)

District	May						Stocks at End of April *a*
	Production		Shipments		Stocks at End of Month		
	1932	1933	1932	1933	1932	1933	1933
Eastern Pa., N. J., and Md	1,334	1,579	1,840	1,465	5,508	3,727	3,612
New York and Maine	610	430	742	548	1,792	1,396	1,514
Ohio, Western Pa., and W. Va	471	642	642	638	3,029	2,680	2,676
Michigan	586	454	416	410	2,211	1,646	1,602
Wis., Ill., Ind., and Ky	821	377	1,032	548	3,561	2,463	2,635
Va., Tenn., Ala., Ga., Fla., and La	718	560	509	625	1,759	1,506	1,571
Eastern Mo., Ia., Minn., and S. Dak	822	440	1,023	657	3,435	2,672	2,888
W. Mo., Neb., Kan., Okla., and Ark	476	567	616	629	1,314	1,370	1,432
Texas	208	333	323	320	685	678	666
Colo., Mont., Utah, Wyo., and Idaho	105	181	123	142	378	391	352
California	538	648	510	683	1,101	1,108	1,142
Oreg. and Wash	224	55	244	83	591	423	452
Totals	6,913	6,266	8,020	6,748	25,394	20,060	20,542

Traffic News and Comment

Recent I. C. C. Decisions

Cement.—Carriers have been authorized to publish rates on cement from Louisville, Neb., to destinations in Minnesota, North Dakota and South Dakota via circuitous routes, provided such routes are not more than 50 per cent. longer than the short route. Rates so established are to be on the basis prescribed in Ash Grove Lime & Portland Cement Co. *v.* C. B. & Q., 190 I. C. C. 103 via the short route and the long-and-short-haul clause may be disregarded. Rates from and to intermediate points must not be higher than the prescribed basis.—I. C. C. F. S. O. No. 11,259.

The commission has found the rate on cement from Alsen, N. Y., to Harlem River Transfer, N. Y., unreasonable to the extent that it exceeded or may exceed 12½c. and has awarded reparation on this finding. The new rate is to be made effective not later than Aug. 31.—I. C. C. Docket No. 25,557, North American Cement Corp. *v.* N. Y. C. *et al.*

Crushed Stone.—On further hearing the commission has modified some previous reports and has prescribed rates to apply on crushed stone from Buffalo and Linwood, Ia., and from La Grange, Mo., representative of which are the following: from Buffalo and Linwood to: Altona and Gerlaw, Ill., 90c.; Arpee and Milledgville, Ill., $1.13; Lomax and Grand Ridge, Ill., $1.20; Merritt and Alsey, Ill., $1.26. From La Grange, Mo., the rate to Burnside and Goodhope, Ill., should be $1.01 and to New Philadelphia and Civer, Ill., $1.13. A complete statement of the prescribed rates will be furnished on request. Rates on sand and gravel from Muscatine, Ia., to destinations in western Illinois are to be made 10c. over the rates prescribed from Buffalo and Linwood, except to destinations of Minneapolis, Farmington, Ill., and west, to which the rates from Muscatine should be the same as from Buffalo and Linwood. The emergency charges may be added.—I. C. C. Docket No. 14,472, Dolese Bros. Co. *v.* A. T. & S. F. *et al.*; No. 16,963, Automatic Gravel Products Co. *et al. v.* C. R. I. & P. *et al.*; No. 17,789, Missouri Gravel Co. *v.* C. B. & Q. *et al.*; No. 20,714, Same *v.* Same.

Limestone.—The rates on natural asphaltic limestone from Margarum, Ala., to destinations in official territory have been found not unreasonable, but the rates on asphaltic limestone to which asphalt has been artificially added, from and to the same points, have been found unreasonable to the extent that they exceeded or may exceed rates made under the scales and in the manner prescribed in Interstate Amesite Co. *v.* A. & R., 172 I. C. C. 100, for application between points in southern territory extended at the rate of 10 c. per ton for each additional distance of 40 mi. over 1,000 mi. The emergency charges may be added and the new rates are to be made effective not later than Sept. 7.—I. C. C. Docket No. 25,059, Asphaltic Limestone Co. *v.* A. & B. B. *et al.*

Slag.—The rates prescribed under Scale B in the National Slag Case, 181 I. C. C. 699, have now been prescribed to apply on slag from points in eastern Pennsylvania to destinations in Massachusetts, Connecticut and New Hampshire, subject to the addition of 70 c. a ton for car-float or lighterage service in New York Harbor. The conditions applying in the National case relative to figuring distances will apply here.—I. C. C. Docket No. 25,294 and Sub. No. 1, 2, 3 and 4, Cash Bros. Inc.; Connecticut Roofing Co., J. J. Moreau & Son; Glennon Roofing Co.; and E. H. Fredrich Co. *v.* various carriers.

Examiners' Reports

Fluxing Stone.—Examiner C. W. Berry recommends that the commission find the rate on fluxing limestone and on crushed or broken limestone, not finely ground, from Myerstown, Pa., to Vulcanite, N. J., unreasonable to the extent that it may exceed $1.12 a gross ton; that the rates to Pittsburgh, McKeesport, West Homestead and Etna, Pa., be found not unreasonable or unduly prejudicial; and that the rate to Youngstown, O., be found unreasonable for the future to the extent that it may exceed $1.16 a gross ton.—I. C. C. Docket No. 25,270, Calcite Quarry Corp. *et al. v.* Reading *et al.*

Lime.—Examiner C. J. Peterson proposes that the commission find the rates on lime from Strasburg Jct., and Linnville, Va., to Charleston and South Charleston, W. Va., not unreasonable and dismiss the complaint.—I. C. C. Docket No. 25,571, Rockdale Lime Co. *v.* B. & O. *et al.*

Sand.—Examiner L. J. P. Fichthorn proposes an award of reparation on a finding that the rate on sand for water softening from Sewell, N. J., to New York Lighterage, N. Y. for export was inapplicable prior to Aug. 25, 1931, and that the applicable rate was $2.45 a ton.—I. C. C. Docket No. 25,597, Hungerford & Terry, Inc. *v.* Pennsylvania.

Examiner John Davey proposes a finding that the rate on silica sand from Clayton, Ia., to Omaha, Neb., was applicable and not unreasonable and that the complaint be dismissed.—I. C. C. Docket No. 25,697, Sunderland Bros. Co. *v.* C. M. St. P. & P. *et al.*

Examiner W. M. C. Cheseldine recommends dismissal of the complaint on the grounds that the rates on sand from Frisbie, Kan., to destinations in Missouri are not prejudicial.—I. C. C. Docket No. 25,887, Welch-Sandler Sand Co. *v.* A. T. & S. F. *et al.*

Sand and Gravel.—Examiner Chas. W. Berry proposes that the rate on sand and gravel from Oreapolis, Neb., to Prescott, Ia., be found not unreasonable in the past but unreasonable for the future to the extent that it may exceed $1.15 per ton.—I. C. C. Docket No. 25,407, and Sub. 1, Reed & Wheelock *v.* C. B. & Q.

Examiner L. B. Dunn proposes that the rate on sand and gravel from Antoine, Ark., to Atkins, La., be found unreasonable for the future to the extent that it exceeds the rate made by use of the distance scale prescribed in 157 I. C. C. 498.—I. C. C. Docket No. 25,715, Louisiana Highway Commission *v.* L. & A. *et al.*

New Complaints Filed

Cement.—Alleging violation of Sec. 1 and 3 in the rates on cement from Speed, Ind., to Waco, Tex., with shippers at Ada, Okla., Okay Jct., Ark., Iola, Kan., Kosmosdale, Ky., North Birmingham, Ala., and Ft. Scott, Kan., preferred, complainants are asking for reasonable rates and reparation.—I. C. C. Docket No. 26,013, Louisville Cement Co., Louisville, Ky. *v.* Pennsylvania.

Lime.—Complaining of unreasonable rates and charges on lime from Tom's Brook, to New York City for L. V. delivery, rates based on the southern lime scale and reparation are sought.—I. C. C. Docket No. 26,024, Tom's Brook Lime & Stone Co., Inc., *v.* Southern *et al.*

Sand.—On all allegation of violation of Sec. 2 and 3 on silica sand between Jackson, O., and Detroit, Mich., with discrimination in favor of the Ohio Quartz Products Co., at Jackson, O., new rates are sought.—I. C. C. Docket No. 25,997, Akron Chamber of Commerce on behalf of Columbia Silica Co., Akron, O., *v.* A. C. & Y. *et al.*

On a charge of unreasonable rates on sand from southern New Jersey points to Locust Summit and St. Nicholas, Pa., new rates are sought.—I. C. C. Docket No. 26,025, The Philadelphia & Reading Coal & Iron Co. *v.* A. C. R.R. *et al.*

Sand and Gravel.—New rates and reparation are sought on an allegation of unreasonable charges on sand and gravel from Louisville, Neb., to Atlantic and Lorah, Ia.—I. C. C. Docket No. 26,034, C. F. Lytle Construction Co., Sioux City, Ia. *v.* C. R. I. & P.

A cease-and-desist order and reparation are sought on an allegation of violation of Sec. 1 and 3 on sand

and gravel from Rock Island, Ill., to Davenport and Bettendorf, Ia., as compared with the rate from Linwood, Ia., to Davenport, Ia.—I. C. C. Docket No. 26,039, Rock Island Sand & Gravel Co., Rock Island, Ill. *v.* C. B. & Q. *et al.*

Talc.—New rates and reparation are sought on an allegation of unreasonable rates on talc from Hailesboro, N. Y., to St. Louis, Grand Rapids, Mich., and Ft. Dodge, Ia.—I. C. C. Docket No. 25,991, Certainteed Products Corp, New York, N. Y. *v.* C. & N. W. *et al.*

Rate-Committee Dockets

New England Freight Assn.

Crushed Stone.—Carriers propose to revise the rates on crushed stone and crushed mable for terrazzo aggregate to Class 17½ from Brandon and Middlebury, Vt., to N. E., T. L. and C. F. A. points to place quarries at these points on the same basis as quarries in the South.—Docket No. 29,219.

Trunk Line Assn.

Crushed Stone and Amiesite.—Carriers propose to increase the rates on crushed stone[1] and on amiesite[1] from Oriskany Falls and Munn's, N. Y., to stations on the D. & H. These increases are purported to bring the rates up to a point comparable with the rates from Jamesville, N. Y. A statement of the proposed rates will be furnished on request.—Docket No. 30,989.

Central Freight Assn.

Agricultural Limestone.—Shippers propose the following adjustment in the rates on agricultural limestone from Piqua, O.—Docket No. 36,051.

To	Proposed	Present
Sturgis, Mich.	$1.65	$2.20
Kalamazoo, Mich.	1.75	2.40
Grand Rapids, Mich.	1.85	2.80
Quincy, Mich.	1.87	2.20
Lansing, Mich.	1.97	2.60
Jackson, Mich.	1.82	2.20

Cement.—Carriers propose reductions in the rates on cement from Bay City, Mich., to destinations in Wisconsin, representative of which are: to Amherst Jct. from 31 c. to 15½ c.; to Appleton from 25 c. to 14½ c.; to Casco Jct., from 23 c. to 14 c.; to Elaud from 32 c. to 16 c.; to Fond du Lac, Menasha, Neenah and North Lake from 25 c. to 14½ c.; and to White Lake from 33 c. to 16 c.—Docket No. 36,071.

Crushed Stone.—Shippers propose a reduction in the rate on crushed stone from Hillsville and Shaw Jct., Pa., to Starford, Pa., to $1.60 per net ton.—Docket No. 36,179.

Carriers propose a reduction in the rate on crushed stone from Glass Rock, Ind., to Jasper and Huntingburg, Ind., from 86 c. to 80 c. per net ton.—Docket No. 36,212.

Dolomite.—Shippers propose a rate of $2.50 per net ton on raw dolomite and fluxing stone in box-cars from Genoa, Martin, Marblehead and Luckey, O., to Corning and Elmira, N. Y.—Docket No. 36,121.

Carriers propose to establish a proportional rate on raw dolomite and fluxing stone from Genoa, Martin, Marblehead and Luckey, O., to Cairo and Thebes, Ill., on traffic destined to points beyond, of $3.15 per gross ton.—Docket No. 35,913.

Fluxing Stone.—A reduction in the rate on fluxing stone from Piqua, O., to Wheeling and Benwood, W. Va., and to Martins Ferry and Steubenville, O., from $1.96 to $1.23 per gross ton is proposed by shippers.—Docket No. 36,079.

A reduction in the rate on furnace or foundry limestone from Cleveland, O., to Steubenville, O., to $1.05 and to Wheeling, W. Va., to $1.13 per gross ton is proposed by shippers.—Docket No. 36,129.

A reduction in the rate on furnace or foundry limestone from Cleveland, O., to Mingo Jct., O., to $1.05 per gross ton is proposed by shippers.—Docket No. 36,023.

Ground Limestone.—Shippers propose the establishment of a rating on ground limestone when shipped l. c. l. in cartons, in barrels or boxes, or in bulk in bags, barrels or boxes, between all points in C. F. A. territory of sixth class with a minimum rate of 10 c. The present rating is fourth class.—Docket No. 35,899.

Lime.—Shippers propose the publication of reduced rates on lime from Carey, Marion and Owens, O., to destinations in Ontario. Representative reductions applying from Carey are: to Brantford from 22 c. to 16 c.; to Chatham from 21½ c. to 16 c.; to Essex from 19½ c. to 15½ c.; to Montreal from 43½ c. to 31 c.; to Hamilton from 25 c. to 18½ c.; to Quebec from 52 c. to 36½ c.; and to Welland from 25 c. to 18½ c.—Docket No. 35,974.

Western Trunk Lines Committee

Agricultural Limestone.—Shippers are proposing a flat reduction of 25 per cent. in all the rates on agricultural limestone between points in Illinois, Indiana, Iowa, Missouri and Wisconsin.—Docket No. 5,338-C.

Other shippers are proposing that the application of emergency charges on agricultural limestone be cancelled on shipments between points in the states of Illinois, Wisconsin and Minnesota.—Docket No. 6,962-C.

Cement.—Shippers propose a reduction in the rates on cement from La Salle, Ill., to River Falls, Beldenville and Ellsworth, Wis., from 17½ c. to 17 c.—Docket No. 8,480.

Shippers propose a rate of 15½ c. on cement from Mason City, Ia., to Victoria, Ill.—Docket No. 8,494.

It is proposed to amend all tariffs applying on hydraulic, natural and Portland cement to provide that shipments of these cements, in standard-size sacks, combined length and breadth from 47 to 49 in., both inclusive, or containing 1 cu. ft., will be accepted and charged for on the basis of estimated weight of 95 lb. per sack.—Docket No. 8,506.

Crushed Stone.—Shippers propose a rate on crushed stone from Dell Rapids, S. D., to Mexico, Mo., of 13½ c.—Docket No. 7,270-C.

Lime.—It is proposed to reduce the proportional rate on lime, car-load minimum weight 30,000 lb., applying from Dubuque, Ia. (when from beyond), to Des Moines, Ft. Dodge, Gypsum and Webster City, Ia., to 10½ c. per 100 lb.—Docket No. 5,790-F.

Southern Freight Assn.

Ground Limestone.—Shippers propose a rate on limestone or marble ground or pulverized to a fineness of 200 mesh, car-load minimum weight 60,000 lb., from Cartersville, Ga., to Watervliet, Mich., of $4.89 per net ton.—Docket No. 1,810.

Lime.—It is proposed to establish a commodity rate on fluxing lime having no commercial value for chemical or building purposes, from Crab Orchard, Tenn., to Alabama City, Ala., of $1.86 per net ton.—Docket No. 1,769.

Shippers propose a proportional rate on lime for export from Crab Orchard, Tenn., to Key West, Fla., of $5.41 per net ton.—Docket No. 1,506 Sup. 1.

Talc.—Carriers propose a rate on talc in bags, barrels or boxes, car-load minimum weight 50,000 lb., from Cartersville, Ga., to Passaic, N. J., of $6.66 per net ton including marine insurance.—Docket No. 1,729.

Carriers propose a rate on talc, car-load minimum weight 36,000 lb., from Panama City, Fla., ex-boat, to Alexander City, Ala., of 20 c. per 100 lb.—Docket No. 1,777.

Shippers at Chatsworth, Ga., are asking for a rate on talc, car-load minimum weight 50,000 lb. to New York, N. Y., of $6.46 and to Newark, Kearney, Harrison, Port Newark and Rutherford, N. J., of $6.66 per net ton.—Docket No. 1,862.

Southwestern Freight Bureau

Cement.—Western Trunk Line Docket No. 8,506 is being considered by this bureau under Docket No. 1,135 to apply between points in this territory.

Cement and Plaster.—Shippers are asking for the establishment of a stop-over privilege to partly unload at intermediate points in Kansas and Oklahoma on shipments of cement and/or plaster from Colorado origins to destinations in Oklahoma.—Docket No. 1,153.

Dolomite.—Shippers are proposing reductions in the rates on dolomite from Narlo and Maple Grove, O., to Sand Springs, Okla., from 39½ c. to 25 c. and to Ft. Worth, Tex., from 39½ to 30 c. per 100 lb.—Docket No. 1,111.

Sand.—Shippers propose the establishment of a rate on silica sand[1] from Guion, Ark., to El Paso, Tex., of $4.55 per net ton.—Docket No. 1,240.

Texas-Louisiana Tariff Bureau

Sand and Gravel.—Carriers propose a rate on sand and gravel from Hobb's Spur, Tex., to Troy, Tex., of 27 c. per net ton to meet truck competition.—Docket No. 7,966-4.

[1] The car-load minimum weight will be 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply.

New Machinery and Supplies

Krupp Works Announce Compound Tube-Mills

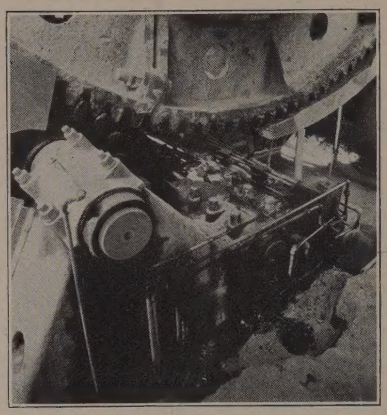
Thomas Prosser & Son, New York, N. Y., American representatives of the Fried. Krupp Grusonwerk, A.G., Magdeburg-Buckau, Germany, announce the manufacture of Krupp compound tube-mills in sizes and types to meet any requirements. These mills have three compartments and are available in sizes from about 4 ft. 6 in. to 9 ft. 3 in. in diameter and from about 29 ft. to 50 ft. in length.

The Krupp tube-mill is suitable for either wet or dry grinding and it is provided at each end with hollow trunnions of extra-large diameter journalled in strong neck bearings having automatic oil lubrication. Material is fed to the mill through the hollow trunnion journal by means of a feed device which can be regulated while in operation. By regulating the feed and adjusting the effective lengths of the inner compartments (by sliding the partition walls one way or the other) it is possible to control the fine grinding to suit the characteristics of the material so that any desired degree of fineness can be attained.

The Krupp compound tube-mill may be obtained with any desired type of drive, with circular rack and pinion, with intermediate spur gear or direct coupling to the motor, or with the Krupp patented Centra drive, in which all the moving parts are fully-inclosed, resulting in the greatest possible protection from dust and the greatest degree of safety for the workmen. Both the driving and driven shafts of the Centra unit are equipped with flexible couplings and the drive is applied to the mill through a centrally-applied coupling spindle.

Automatic Lubrication in Okla. Cement Plant

The Oklahoma Portland Cement Co., Ada, Okla., late in the fall of 1932 overhauled the drives of its three 10-ft. by 11-ft. 3-in. by 240-ft. P&M rotary kilns. At that time a Farval Dualine full-automatic centralized lubricating system was installed on each drive. This type was selected because the continuous heavy-duty service requires frequent delivery of the proper lubricant.

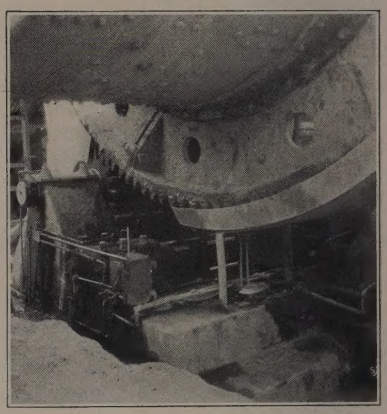


Automatic lubricating system on kiln drive.

Each drive has its own individual system which serves its 11 bearings with measured quantities of lubricant under pressure at predetermined-time intervals. The central pumping unit serves these 11 points through two 4-valve and one 3-valve manifold. These are located at convenient points on the drive and a discharge line runs from each valve to the bearing it serves. The three manifolds are located in the header lines and the two header lines are in turn connected to the central control unit.

The central pumping unit may be either manually operated at any desired interval or may be automatically operated to discharge the individual measuring valves at the bearings at adjustable predetermined time cycles. The central control unit consists of an adjustable-delivery piston pump, an 8-quart reservoir, an accumulator, and an automatic reversing 4-way valve.

The adjustable pump is driven by means of one of the shafts of the drive operating at a speed of 23 r.p.m. The delivery of the pump operates the entire system and thus lubrication automatically starts and stops with the operation of the drive. By regulating the delivery of the pump, the time required for a complete operation of the system can be set and this time can be varied by varying the delivery of the pump.

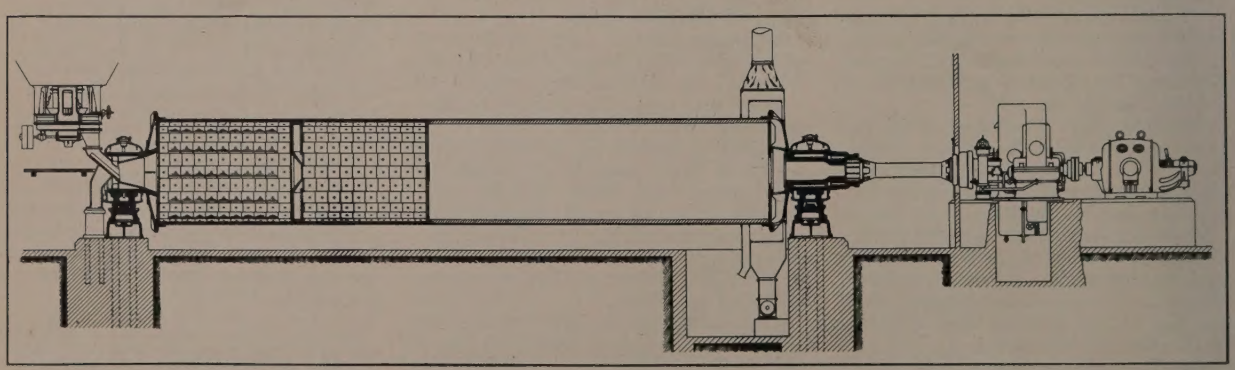


Another view of kiln-drive lubricating system.

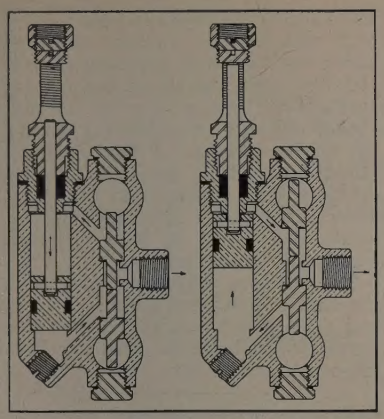
The accumulator which is part of the reservoir is merely an expansion unit which is used to prolong the time between operations of the system. For fast operations of the system the accumulator can be cut out by means of a simple gate valve and in this case the system may be regulated to operate once every 30 sec. to once every minute. With the accumulator in the system, the time can be regulated for any cycle between 16 min. and 32 min.

Each measuring valve is individually adjustable as to quantity and equipped with a tell-tale sight indicator. The valve is fully automatic and contains no restricted passages, ball checks, or springs. Its operation is controlled entirely by hydraulic pressure on the lubricant in the supply lines.

Each individual valve can be regulated to deliver any quantity of lubricant between .02 oz. and .08 oz.



Three-compartment tube-mill with central feed, discharge and drive.



The Farval automatic valve in open and closed positions.

per shot. By regulating the frequency of operation to amply care for the bearing receiving the most severe service, all valves may be regulated to deliver to their respective bearings the quantity of lubricant they require at this frequency.

The delivery of the pump causes pressure to be built in one of the two header lines and this pressure in turn operates all of the measuring valves in one direction, discharging predetermined measured quantities of lubricant to the bearings from one side of the valve and loading the valve on the other side.

The operating pressure of 1,000 lb. or more is controlled at the ends of the header lines. When the desired pressure is reached the automatic reversing 4-way valve will alternate the pressure from one line to the other discharging all measuring valves with each reversal. The 4-way valve thus automatically directs the pressure from one line to the other and regulates the pressure at which the system operates.

New Clinker Cooler Has Traveling Grate

The Lee Process clinker cooler made by the Cement Mill Equipment Co., Division of the H. S. Lee Corp., Detroit, Mich., is the result of many years of experimentation. Small models were first used. Then a small semi-commercial unit was installed in a cement plant and had a capacity of 100 bbl. in 24 hr.

The first commercial installation of the Lee cooler was made in 1930. This unit was of the one-zone type because of space limitations and had a capacity of 1,600 bbl. per day. In spite of these limitations a saving of over 12 per cent. in fuel was made. The clinker was discharged at a temperature of 900 deg. F. and the kiln secondary air was preheated to about 1,200 deg. F. More recent installations were of the two-zone type and incorporated improvements resulting from studies of the first installation which, it is said, have made them even more efficient.

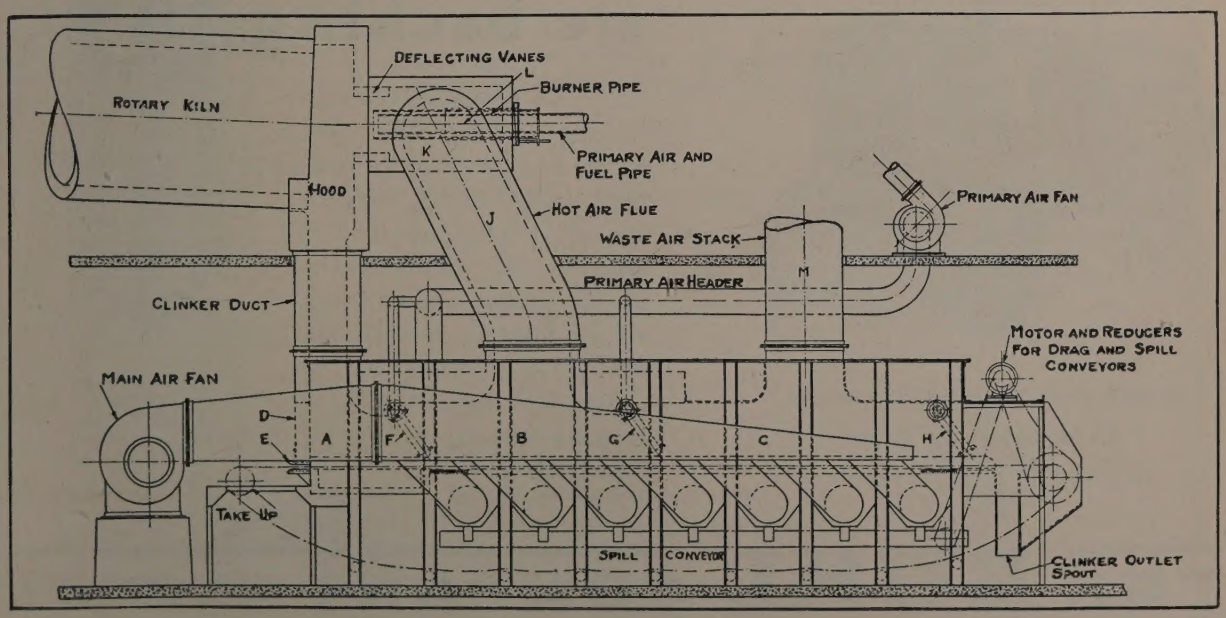
The latest type of Lee cooler is divided into three chambers, A, B and C. The hot clinker from the kiln falls to A, the inlet chamber, which is insulated on all sides. The walls and bottom of the chamber are lined with fire brick. The lower part of the walls are faced with carborundum liners to resist the abrasive action of the falling clinker. A swinging door, D, facilitates inspection and repairs and is also carborundum lined.

The traveling grate or drag-chain enters this chamber at E and carries the clinker over the grate bars in the initial and final cooling zones or chambers, B and C. The ratios of the total grate area in these two zones varies in individual installations to suite requirements. Swinging gates, F, G and H, separate the three chambers from each other and seal the end of the final cooling zone. F and G, being exposed to the high temperatures in the initial zone, are made of high-temperature-resisting alloys and are air-cooled, while gate H is an ordinary steel casting and is not air-cooled.

Air is furnished by a main air fan and directed upward through the grates by hopper-shaped boxes placed under the grates at 4-ft. intervals. Individual dampers allow the flow of air to be controlled at every 4-ft. interval of grate length. These boxes also collect whatever clinker falls through the gates. A small drag-chain, completely inclosed in an air-tight casing, collects the spill.

The highly-heated air from the initial cooler zone is delivered to the kiln through the hot flue, J, and the bustle, K. The latter is fastened to the kiln hood and is fitted with vanes which impart a whirling motion to the secondary air as it enters the kiln. The air from the final cooling zone is drawn by induced draft through the waste-air stack, M. The air for cooling the two gates also comes from the main air fan and, together with the air from the air jacket which completely surrounds the cooling zones and a portion of the entrance chamber, is induced to the primary air fan, thus preheating the primary airstream. The clinker discharge spout is set at an angle of 45 deg. and may be turned to deliver to either side of the cooler.

The drag-chains used in these coolers are of a special composition for heat and wear resistance and high tensile strength. In capacities up to 800 bbl. per day one strand is used and in the larger sizes two parallel strands are used. Six-tooth, extra-heavy cast-steel sprockets are used on the head and tail shafts and a take-up



The Lee Process clinker cooler showing three chambers, grate, etc.

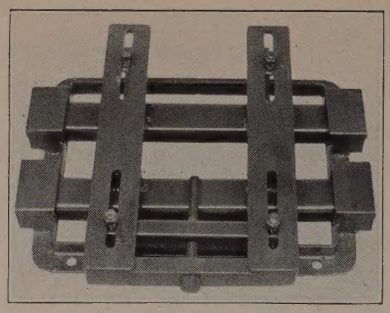
is provided to compensate for chain expansion and wear.

Where direct current is available a variable-speed motor drives the cooler mechanism through a speed-reducer and roller chain. Another roller-chain drive from the same reducer drives the small drag-chain conveyor which takes the clinker that falls through the grates. Where only alternating current is available a variable-speed mechanism is used.

Sound-Isolating Motor Base Developed by G. E.

The General Electric Co., Schenectady, N. Y., has developed a new motor base with scientifically-designed sound-isolating features. The floating members of this base are suspended on specially-developed isolating material which, it is claimed, is so enclosed and mounted that long life and freedom from damage result. The motor is mounted on a standard sliding base, and belt tension and motor alignment are maintained in the ordinary manner.

These bases are said to be designed for use with each particular motor for which they are recommended and are equally effective at any motor speed between 100 and 60 per cent. of normal. They are available for squirrel-cage and wound-rotor induction motors of from ¾ to 50 hp. and for single-phase motors of ½ to 50 hp.



New sound-isolating motor base.

Neff & Fry Improve Bin and Batcher Equipment

The Neff & Fry Co., Camden, O., has recently completed some important improvements to its line of portable concrete-stave storage silos and batching equipment. The silo staves are made by the latest and most scientific methods by special machines which use hydraulic pressure of over 150 tons and produce a concrete of such density that a man can immediately walk on a stave without leaving the slightest mark. A final crushing strength of 7,000 lb. per sq. in. for this concrete is not unusual. As the staves are made in solid steel castings absolute uniformity of both size and quality are guaranteed.

The batching equipment used with the Neff & Fry plant passes all state and government requirements, is fast operating, and can be used for both large and small jobs.

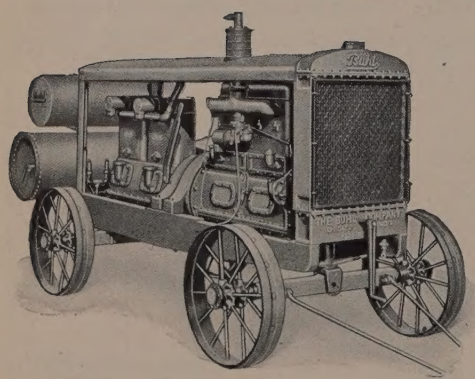
Don't Complain Later!

You can have a voice in approving or criticizing the Code of Fair Competition for your Industry, provided you take part in the Chicago meetings, July 13 and 14. Don't stay away and then complain because your opinions were not heard or considered. That's not fair to your competitors, nor even to yourself.

Officers Elected by Heedicsite Company

The Heedicsite Co., Grand Rapids, Mich., manufacturer of a patented plant and method for producing bituminous paving material, recently held an election of officers. George E. Rex, Kansas City, Mo., formerly vice-president and general manager of the National Lumber & Creösoting Co., is president; Charles Ferguson, former general sales manager of the National Lumber & Creösoting Co., is general sales manager; Charles Kerr, former field engineer for the timber preserve interests of the United States, is southern representative with offices in New Orleans; Charles S. Babb is vice-president and general manager.

Buhl
AIR COMPRESSORS



BUHL Portable Air Compressors
All Mountings, Full Range
Capacity, Trouble-Free Service

are backing US

THE GOVERNMENT is marshalling millions for public works, and the drive for prosperity is on! BUHL Compressors are doing their part to speed up construction jobs by providing the greatest combination of advanced features in BUHL history. Buy a BUHL and be equipped for bigger profits—it is your best trump card for the New Deal.

Read why Buhls are "Years Ahead." Complete Bulletin will be sent on request.

THE BUHL COMPANY Old Colony Bldg. CHICAGO